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AUTHOR Ackerman, Paul Roland
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ABSTRACT

The effectiveness of a diagnostic teaching program in teaching reading to emotionally disturbed and socially maladjusted boys in two schools in New York City was investigated. The diagnostic teaching program specified behavioral objectives which fit the individual student, prescribed instructional styles for the teacher, and outlined techniques of diagnosing individual learning needs. It was hypothesized that the experimental group of about 40 boys, aged 9 to 14 years, would score significantly higher on reading tests than the matched control group. This hypothesis was not supported by the data from the post-tests, although the experimental group did show significantly higher subtest scores in letter names, short sound vowel recognition, short sound vowel production, and two-letter consonant blends. Analysis of correlations of learning mode and score gains suggested that more gains were achieved (1) when motor activities were used as a learning mode, (2) when reading material was relevant to the student's experiences, (3) when differing experiential and knowledge levels were accounted for in instructional materials, and (4) when teachers used a variety of equivalent reading strategies to compensate for short attention span. Tables, a bibliography, and sample diagnostic tests are included. (AL)

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AN EVALUATION OF TAXONOMIC TEACHING AS A METHOD FOR IMPROVING READING SKILLS OF EMOTIONALLY DISTURBED, SOCIALLY MALADJUSTED BOYS

July, 1971

Research and Demonstration Center
for the Education of Handicapped Children
Teachers College, Columbia University

United States Department of Health,
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By Paul Roland Ackerman, Jr.

July, 1971

Research and Demonstration Center
for the Education of Handicapped Children
Teachers College, Columbia University
New York, New York

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ABSTRACT

AN EVALUATION OF TAXONOMIC TEACHING AS A METHOD FOR IMPROVING READING SKILLS OF EMOTIONALLY DISTURBED, SOCIALLY MALADJUSTED BOYS

Paul Roland Ackerman, Jr.

Taxonomic Teaching, a concept of structuring the instructional materials and methodology to teach reading, was introduced to teachers in two "600" schools in New York City. It was the purpose of this research to evaluate the concept as a viable tool for educational change by collecting data relative to pupils' (subjects) reading changes from pre-treatment to post-treatment. The design of the experiment allowed for two experimental groups, receiving various degrees of exposure to the trainers and materials of Taxonomic Teaching (T_1 and T_2) and two control groups, one group (C_1) in the same "600" school as the T_1 and T_2 groups, and one control group (C_2) in a similar "600" school. It was hypothesized that the subjects of the T_1 and T_2 groups would improve significantly in reading skills over the subjects of the C_1 and C_2 groups. Further, it was hypothesized that the T_1 subjects would score significantly greater than the T_2 subjects in reading skill improvement.

Data were collected on a pre-treatment and post-treatment basis which consisted of raw scores on sixteen staff-made measures of varied reading skills; raw scores and grade equivalent scores on a

standardized test of reading, the Gates-MacGinitie Reading Tests; and error scores on the Wepman Auditory Discrimination Test. I.Q. scores on the Peabody Picture Vocabulary Test, and an average of scores of the number of reading materials introduced to each pupil per observed class session were gathered. T_1, T_2 and C_1 classes were observed at regular intervals and each child was described in two minute intervals according to a Taxonomic Teaching classification, a grid of fifty-two variables. His time in each cell of the grid was added and converted to a percentage of the total time each child was observed.

Eighty-five subjects were observed and tested in all. The n of T_1 was twenty, the n of T_2 was nineteen, C_1's n was sixteen, and the n of C_2 was thirty. The entire experiment took one school year; subjects were tested on the pre-treatment and post-treatment measures within the first and last month of the school year; the I.Q. measure was obtained throughout the school year; and the materials index and taxonomic classification percentage were obtained from twice a week observations of thirty minutes each in the classroom. Level of significance was set at .10 for the test of major hypothesis (significant reading score improvement) and .05 for the exploratory hypotheses.

The major hypothesis, that there would be a significant difference in the post-test Gates-MacGinitie Reading Test scores was statistically tested by an analysis of co-variance. The major hypothesis was not substantiated.

Exploratory data analyses were computed on scores of the staff-made

tests. Four variables were found to be significant: letter names, short sound vowel recognition, short sound vowel production and two-letter consonant blends. Treatment group scores were significantly higher than control groups in analyses of group means using the Scheffé test.

Exploratory correlations were run between scores representing involvement in Taxonomic activities and reading score gains. These analyses revealed that students made more reading score gains when motor activities were utilized as a learning mode, when reading content was made more relevant to their experiences, when differing experiential and knowledge levels were accounted for in instructional materials, and when teachers employed a variety of equivalent reading strategies to compensate for a short attention span. These effects and interpretations were observed despite the fact that the schools used in this experiment had been in turmoil the entire year because of a prolonged teacher strike.

Further research in a less chaotic year was recommended.

ACKNOWLEDGMENTS

A quantitative evaluation of a major demonstration project is never the product of a single evaluator. Objectives must be elicited from the authors of the project. Evaluation techniques must be orchestrated to the needs of the evaluated institution. Treatment staffs must be helped to avoid contamination. Massive amounts of data which are generated in such an evaluation must be carefully examined and integrated by more than one knowledgeable person. Thus the acknowledgments for this study must approach battalion size; a company or a unit could not have succeeded in conquering the resistant fields of both reading lag and teaching boys with emotional and social disturbances. The author, because he was not the commanding officer, feels a close comradeship with the rest of those soldiers that assisted in attaining the victory.

Mrs. Helen Hanacker and Dr. Albert Budnick administered the schools of the project and graciously arranged the schedule and facilities of the school to meet the needs of the evaluation plan.

The treatment staff, led by Mrs. Shirley Goldwater, gave yeoman service to the project. The efforts of Mr. Joseph Brodack, Mr. Patrick Shifano, Mrs. Jill Aubry, Mrs. Deborah Schanzer, Mrs. Hedy Schlackman, and Mrs. Therese Carr will always be remembered for their sincerity and loyalty.

Of the faculty of Teachers College who participated in this evaluation, sincere and grateful appreciation must be expressed to

Dr. Sanford Reichert who acted with an unusual and motivating capacity to care. Professor Frances Connor proved a true advocate in the arrangements of the guiding committee. Professor Leonard Blackman, in his role as moderator and mentor, gave new meaning to the roles and added significant insight to the product.

But it is to my wife, Mrs. Billie Ackerman, that a lion's share of acknowledgment must go. Without her typing, editing, sympathizing, motivating, caring, and even chiding, the evaluation might not have been completed. That it is complete is a tribute, not to an author, but to a family.

P.R.A.

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CHAPTER I

BACKGROUND AND NEED

In 1946 the New York City Board of Education initiated a program of separate public day schools to provide education for children "so severely emotionally disturbed or socially maladjusted as to make continuance in a regular school hazardous to their own safety and welfare and the safety and welfare of the other pupils."[1] These schools were called "600" schools because their Public School number lay between 601 and 699.

At the present time the "600" schools, having grown continuously in number and types, total forty-four facilities, fifteen of which are residential. The "600" schools serve approximately 5,000 boys and girls, approximately 2,000 of whom are boarded in the residential schools. The stated purpose of the "600" schools is still, as in their inception, ". . . to <u>educate</u> [italics not in the original] emotionally disturbed and socially maladjusted children. . . ."[2] It is, therefore, a goal of the "600" schools ". . . to provide an educational environment in which, under the guidance of understanding teachers, the child can participate in educational activities which will produce the learning which he needs, either for continued

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[1]Committee on the "600" Schools, "<u>600" Schools: Yesterday, Today and Tomorrow</u> (New York: New York City Board of Education, 1965), p. 1.

[2]<u>Ibid</u>., p. 10.

education in a regular school situation, or for a vocation for which he can be adequately prepared."[1] This goal, however, has formed the basis for much criticism in recent years as observers have found it inadequately served or officially ignored.

In 1964 the State Education Commissioner's Advisory Committee on Human Relations and Community Tensions investigated the "600" schools and found that their "functions . . . remain vague. We could find, for example, no clear statement of the present curriculum for these schools."[2]

In 1965, a study by the Committee on the "600" Schools again noted a lack of unified and adequate curriculum, and recommended the development of such a curriculum.[3] This report was further taken to task by the Citizens' Committee for Children of New York, Incorporated who, although agreeing with the need for curriculum development, felt that not enough thought had been given to providing guidelines for adequate curriculum. It was the contention of this committee that failure to develop adequate programs of curriculum and curricular

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[1]Committee on the "600" Schools, "600" Schools: Yesterday, Today and Tomorrow, pp. 10-11.

[2]State Educational Commissioner's Advisory Committee on Human Relations and Community Tensions, Desegregating the Public Schools of New York City (New York: Institute of Urban Studies, Teachers College, Columbia University, 1964), p. 24.

[3]Committee on the "600" Schools, "600" Schools: Yesterday, Today and Tomorrow.

help was the result of a "failure to define the program specific."[1]

In 1966 an independent evaluation team investigated a sample of the "600" day schools and found that ". . . in general classes, little if any teaching was going on. Pupils seemed to be involved in busy work, chatting, listening to the radio and playing games."[2]

In 1967 Mackler studied the "600" schools. He found, as had the evaluators preceding him, no efforts at curriculum development or implementation and stated that the New York City Board of Education had "not reviewed or in any other way concerned itself with the issue of the educational well-being of the children in these ['600'] schools. . . ."[3]

Recommendations for the alleviation of these noted curricular deficits were varied. The Committee on the "600" Schools recommended that the New York City Board of Education "strengthen procedures for more effectively adapting the regular school curriculum to the very special individual interests, needs and abilities of '600' school pupils, placing as much stress on how these pupils learn as on what

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[1]Citizens' Committee for Children of New York, Inc., The "600" Schools: Sound Planning Still Is Needed (New York: The Committee, 1965), p. 6.

[2]Abraham J. Tannenbaum, Improving Instruction in Schools for Socially Maladjusted Children--Preliminary Report (New York: Center for Urban Education, 1964), p. 39.

[3]Bernard Mackler, "A Report on the '600' Schools: Dilemmas, Problems, and Solutions," in The Urban R's, ed. by Robert Dentler, Bernard Mackler, and Mary Ellen Warshauer (New York: Frederick A. Praeger, 1967), p. 299.

they learn."[1] The Committee further suggested that teachers receive consultant and supervisory help in individualizing instruction and providing "maximum adaptation of the curriculum, maximum improvement in methodology, and maximum in-service growth and development of teachers and supervisors."[2] The Committee also recommended that a high priority be given to curriculum leading to basic skill acquisition and specified reading as of utmost importance.

Tannenbaum in 1964 suggested that the only visible instructional improvement observed was that occurring in individual tutorial sessions with students. He recommended further expansion of the concept of individualization of curriculum.[3] In 1966 he noted no perceptible improvement in pupil achievement and related it to more reliance on lecture-type teaching than on individualization of instruction. He called for the in-service training of teachers to increase curricular flexibility and effect the individualization of instruction he deemed essential.[4]

Recommendations for improving the curriculum in the "600" schools parallel those offered by most authors recommending

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[1]Committee on the "600" Schools, "600" Schools: Yesterday, Today and Tomorrow, p. 27.

[2]Ibid., pp. 31-32.

[3]Tannenbaum, Improving Instruction in Schools for Socially Maladjusted Children--Preliminary Report.

[4]Abraham J. Tannenbaum, Improving Instruction in Schools for Socially Maladjusted Children (New York: Center for Urban Education, 1966).

educational programs for the emotionally disturbed and socially maladjusted child. Phillips and Haring recommended a classroom situation where the primary teaching methods were those of structure, "knowing each child well and . . . having the ability and perseverance to give the specific direction to the child which is necessary for his growth and progress."[1]

Newman noted that the emotionally disturbed child shifts in his ability to comprehend instruction and tolerate instructional materials. She recommended that the teacher have competencies with a variety of educational methods, materials and subject matter from pre-school to high school. She further stated that a teacher should be able to discard instructional plans and develop new ones on the spot.[2]

The concept of teaching emotionally disturbed and socially maladjusted children seems best summarized by remarks made to Morse by teachers in a school for emotionally disturbed children when asked what it was they taught. "After a pause they replied that they taught everything, and they added that they taught by every known method."[3]

Morse also stated that, "there is one [more] point universally

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[1]E. Lakin Phillips and Norris G. Haring, "Results from Special Techniques for Teaching Emotionally Disturbed Children," Exceptional Children, XXV (October, 1959), 67.

[2]Ruth G. Newman, "The Acting-out Boy," Exceptional Children, XXII (1956), 186-190, 204-216.

[3]William C. Morse, "The Education of Socially Maladjusted and Emotionally Disturbed Children," in Education of Exceptional Children, ed. by William M. Cruickshank and G. Orville Johnson (2nd ed.; Englewood Cliffs, N.J.: Prentice-Hall, 1967), p. 598.

agreed upon by special teachers: The program must be individualized."[1] He explained that the process of individualization first requires diagnosis--psychological diagnosis through tests administered by a psychologist and educational diagnosis obtained by the teacher through the process of diagnostic teaching. When a profile of cognitive/educational strengths and weaknesses is so obtained the teacher must secure materials geared not only to the achievement level of the student but also to the student's expected rate of acquisition. In many cases the teacher will have to develop his own materials. The end result of individualization is to have each child in a classroom working and learning at his own rate and level with instructional material sufficiently motivating to sustain interest and adequately rewarding to deter frustration.

Tannenbaum and the Committee on the "600" Schools felt that teachers in these schools needed help to obtain individualization.[2] To provide a tool by which to train teachers in individualizing and also personalizing the reading instruction of emotionally disturbed and socially maladjusted boys, Tannenbaum and staff devised and piloted an in-service teacher education program based on a system of

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[1]Morse, "The Education of Socially Maladjusted and Emotionally Disturbed Children," p. 602.

[2]Tannenbaum, Improving Instruction in Schools for Socially Maladjusted Children--Preliminary Report; Tannenbaum, Improving Instruction in Schools for Socially Maladjusted Children; Committee on the "600" Schools, "600" Schools: Yesterday, Today and Tomorrow.

teaching called The Taxonomy of Instructional Treatments. The concept of and rationale for the Taxonomy is described by Tannenbaum as follows:

> The Taxonomy [of Instructional Treatments] delimits its concern to the instructional aspects of teaching, specifically the pupil's engagement in absorbing adaptive basic skills and concepts. Teaching, or the other hand, embraces the total spectrum of teacher-pupil behavioral transactions, which includes not only the instructional processes as defined here, but also the cultivation of supportive, ego-building interpersonal relationships, the evocation of productive intellective processes, and the development of reward and feedback mechanisms for behavior control. A fundamental hypothesis being tested by the project is that the teacher's ability to regulate a pupil's engagement--or his responsiveness and attentionality to instructional stimuli--in the learning experience has both therapeutic and scholastic value. It is further hypothesized that for each pupil there is a unique set of tactics best suited to control his engagement at a given moment in time. The teacher's instructional role is to achieve "a goodness of fit" between the pupil's functional capacity and preferred learning style on the one hand and the organization of content and strategy for instructional transmission on the other. Attainment of the proper match is defined here as individualized instruction. However, the ultimate goal is to move the pupil from individualized to personalized instruction in which engagement control is maintained even through hitherto unfavored tactics. In other words, individualization implies the location of the best "wavelength" between transmitter (teacher) and receiver (pupil) while personalization involves the improvement of reception on an increasing number of wavelengths.
>
> The two step process--toward individualization and then toward personalization--is facilitated by the Taxonomy of Instructional Treatments, an operative model of the kaleidoscope of instructional behaviors. Such a model is needed not only because it attempts to define the parameters of the teacher's instructional role; it is useful also as an aid to information processing as the teacher plans for instruction. If a particular pupil's engagement is most effectively aroused by a given combination of instructional content, communication channels for receiving and transmitting messages, and strategies for performing the instructional act, the teacher should have mastery of a

large array of possible alternative combinations before processing them for the appropriate one to be successful, or even meaningful. Thus, for example, the teacher whose instructional mode is restricted to lecturing and test-response dialogue is not likely to penetrate most successfully to the pupil who prefers his stimuli "packaged" in puzzles or games. Information processing is a delicate, complicated task for the teacher when all of the relevant "bits" are available. When they are not, the task is an impossible one. The incompetent teacher processes few "bits" because few exist in her repertoire. The highly competent teacher likewise processes few "bits" because the great number of unpromising alternatives are quickly eliminated and the choice is made from the few most appropriate ones.

Some emotionally unstable children are so erratic and unpredictable in their response patterns that no combination of instructional stimuli produces optimal engagement on successive trials. Others are so distractable that no particular stimulus can sustain attention for more than a short period of time. In such instances the teacher has to be adroit enough to shift from one strategy to the next either to achieve or maintain engagement, and this is possible only if his arsenal of strategies is abundant and systematically organized. The Taxonomy is the organizing index to the universe of instructional behaviors. Structurally, it takes into account the teacher's function in (a) organizing instructional content logically and sequentially through some epistemological analysis; (b) transmitting instructional stimuli through any of the pupil's receptive sensory modalities; (c) eliciting responsiveness through any of the pupil's expressive channels of communication; and (d) mastering the total range of instructional modes (or styles) and methods (pupil grouping arrangements) available to be utilized.

As an analytic tool, the Taxonomy provides criteria for assessing the child's learning status and how he interacts with a formal instructional stimulus. It allows the teacher to determine which Basic Skills and related Subskills the child must master; at what difficulty level this content can be learned; the Communications Input that galvanizes maximum reception; the Communications Output that conducts maximum responsiveness; the Instructional Mode that engages attention and fixes interest in the learning task; and the Instructional Method of grouping to provide the most supportive, distraction-free environment for learning.

The Taxonomy also systematizes the teacher's stylistic

repertoire by classifying the behavioral alternatives open to him during the instructional act. To make these styles operative, it is necessary to create and assemble instructional materials that will plug appropriate content into every specified teaching style. Once the teacher has determined precisely what skill deficits handicap the child he elects the preferred instructional content and teaching behavior from the array outlined in the taxonomy. He is then guided to the teaching aids that fit his requirement by the Taxonomy Code system which forms the indexing scheme for the materials. The task of the curriculum specialist is to keep the library of instructional aids stocked in such a manner as to fulfill the content and teacher behavior specifications suggested by the Taxonomy. Thus, a diagnosis of individual learning needs is directly applicable to an educational catalog that provides sources of methods and materials to match the diagnosis. Whereas most teachers move from the formal or informal diagnosis of a child's functional capacities to the selection of appropriate instructional materials, the Taxonomy provides them with an intermediate step. After making the diagnosis, the teacher determines appropriate instructional content and strategy and then searches for materials to fit his contentual and strategic requirements. The result is prescriptive teaching and a broad diversification of approaches to instruction.[1]

A teaching and resource staff was formulated to train teachers in the meaning and practices of the Taxonomy of Instructional Treatments. Prior to the initiation of this experiment, Tannenbaum and staff had instituted the Taxonomy of Instructional Treatments at a newly established "600" school in Manhattan and had used the experience in validating many of the concepts of the Taxonomy of Instructional Treatments and in making more efficient their skills of in-service training, diagnostic teaching and materials production.

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[1]Sandford Reichart, The Taxonomic Instruction Project: A Manual of Principles and Practices Pertaining to the Content of Instruction (First Report) (New York: Research and Demonstration Center for the Education of Handicapped Children, Teachers College, Columbia University, 1969), pp. vii-viii.

The 1968-69 school year found the resource staff in a new and typical "600" day school in Queens, New York City. The resource staff was charged with offering assistance to teachers and children in a design which allowed evaluation of the effect of this assistance on children's reading scores. The experiment proposed to evaluate the effect of taxonomic assistance to both teachers and children and postulated that teachers receiving the service would teach more efficaciously and their students would obtain significantly greater reading gain scores than children of teachers who did not receive services from the resource staff. In the process an attempt was made to correlate reading score gains with observed differences in teaching methods and materials.

CHAPTER II

REVIEW OF LITERATURE AND HYPOTHESES

As stated previously, the Treatment condition of this experiment, i.e., assistance to teachers of emotionally disturbed and socially maladjusted children in diagnostic teaching and individualization of the reading program for their students, was initiated in a "600" school (Public School 148, Manhattan) in the school year 1967-68.[1] The purpose of this program was to provide the resource staff with a student and teacher population with which they might (1) derive and validate tests and observational procedures necessary to diagnostic teaching; (2) create instructional reading materials to fit the Taxonomy of Instructional Treatments; (3) catalogue existing instructional reading materials according to the Taxonomy of Instructional Treatments; and (4) improve the staff's skills in student testing, classroom observation, and in-service training. Measures of evaluation were purposely kept informal to allow immediate feedback of information to both staff and teacher and to secure information from teachers peripherally involved in the project. Evaluative data consisted of reading scores (Gates-MacGinitie Reading Tests, Form B-1 and B-2) administered at the first and last months of the school year, written observations by all teachers in the school, and interviews with students and teachers involved in the project.

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[1]School numbers of "600" schools were changed in 1967.

Tannenbaum summarized the results:

> To date, the pupils have made noteworthy progress toward closing the gap between actual and expected achievement which averaged more than three years at the outset. In addition, observations by the project staff, by the teachers involved in the program as well as those not involved, by the district psychologist, by the school and district administrators, and by visitors to the project report a sharp improvement in the children's overt behavior, implied attitudes, and perceptions of school. School attendance rates have risen while motivation to learn has increased. Two teachers not involved in the project report a carry-over to their classrooms after the children leave the project classrooms. Considering the fact that this population is a selected group of behaviorally disordered pupils, the changes observed have exceeded the project staff's expectations. The school principal and psychologist both feel that the most dramatic effect of the program has been the radical change in teacher attitude and concomitant teacher style.[1]

Even though Bloom, in developing the Taxonomy of Educational Objectives, predicted the use of the Taxonomy for diagnosis and prescriptive teaching, his Taxonomy has rarely been translated into an in-service reading tool and even more rarely evaluated as such.[2] Perhaps the most relevant evaluation is that performed by Sister Mary Josephine, who compared reading gains in schools which had been given supervisory help in pupil program individualization to expected gains from the standardization sample. She found significant reading

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[1]Abraham J. Tannenbaum, Demonstration Proposal for Renewal and Expansion of Project No. OEG-1-6-062528-2092, Research and Demonstration Center for Handicapped Children and Youth (New York: Teachers College, Columbia University, 1968), pp. 10-11.

[2]Benjamin S. Bloom, et al., Taxonomy of Educational Objectives Handbook I: Cognitive Domain (New York: Longmans Green and Co., 1956), pp. 20-24.

score gains both in comprehension and vocabulary in these schools where teachers had been given specialized help through demonstration lessons, procedural instruction in working with small groups, specialized material, supplementary material, and in-service training to teachers. The pupils in her study were, however, the "normal" population of the upper-grade elementary schools.[1]

Another evaluation using a population of emotionally disturbed children was instituted by Haring and Phillips. They investigated two different types of classroom settings and a control classroom to determine their effectiveness in raising the academic achievement levels of emotionally disturbed children. One of the experimental classrooms was labeled a "permissive classroom" because the teachers were instructed to allow the children to help plan lessons and to have free access to any part of the room at any time. The second experimental classroom was labeled a "structured classroom" and teachers in this classroom were instructed in methods of discipline and lesson planning that kept the child busy and at his own level of achievement during the day.[2] More specifically, Phillips listed the following conditions of the "structured" treatment classroom which are similar to the Treatment condition of this experiment: (1) each

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[1]Sister Mary Josephine, "Evaluation of Supervisory Programs in Reading," Educational Administration and Supervision, XXXX (1954), 434-437.

[2]Norris G. Haring and E. Lakin Phillips, Educating Emotionally Disturbed Children (New York: McGraw-Hill Book Co., 1962).

teacher develops an overall academic plan for each child for each day; (2) the teachers seek to keep their relationship with the children educationally task centered; (3) the teacher seeks to evaluate the child's educational growth often through tests and observations; and (4) the teacher seeks to reformulate the plan of education as often as is needed.[1] They found that over a one year period the "structured classroom" students made gains of 1.97 years on the average. This gain in overall achievement, as measured on the California Achievement Tests, was significantly higher than any of the other classroom settings.

Gains in achievement from "structuring" should not be unexpected, according to the research of Heil, et al., Grimes and Allinsmith, and Rowan. Heil, et al., classified teacher behaviors as related to teaching style and identified three types of teachers, the "turbulent," the "self-controlling," and the "fearful." They related these teaching styles to academic achievements of children and found that the "self-controlling" teacher was the significantly most effective teacher in raising achievement levels. The "self-controlling" teacher is described as one who applies the concept of "structure" to the classroom and attempts to individualize the lesson plans of the

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[1]E. Lakin Phillips, "Problems in Educating Emotionally Disturbed Children," in Methods in Special Education, ed. by Norris G. Haring and Richard L. Schiefelbusch (New York: McGraw-Hill, 1967), pp. 150-152.

students.[1]

Grimes and Allinsmith relate the factors of compulsivity and anxiety in children to achievement gains in reading in schools that use a detailed "structured" approach to reading instruction versus those schools which do not use a "structured" approach to reading. They hypothesized that highly anxious or compulsive children who were taught reading initially by "structured" methods would show more achievement by the third grade than similar children taught in schools where an "unstructured" approach to beginning reading was used. Their hypothesis was supported by the results of the study.[2]

Finally, Roman, using a population of legally defined delinquents, compared three treatments of matched groups on reading score gains. To one group he gave remedial reading from a standard reading program. To another group he administered reading instruction in a group, combining it with group therapy and diagnosis, and tailoring the reading level to members in the group. To the third group he administered group psychotherapy only, using "mental health" as the only goal of the group. The most successful and significant gains were made by the second group whose treatment he labeled "tutorial

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[1]L. W. Heil, M. Bowell, and I. Feifer, Characteristics of Teacher Behavior Related to the Achievement of Children in Several Elementary Grades (Brooklyn, New York: Brooklyn College, Office of Testing Research, 1960).

[2]J. W. Grimes and W. Allinsmith, "Compulsivity, Anxiety and School Achievement," Merrill-Palmer Quarterly, VII, No. 4 (October, 1961), 247-271.

group therapy." Next most effective treatment was the remedial reading group, and both the tutorial and remedial reading groups were significantly more successful in improving reading score gains than was the group given group psychotherapy only.[1]

In summary, literature evaluating sub-parts of the Treatment proposed in this experiment suggests that these sub-part procedures and teaching styles have successfully improved reading scores in "normal" as well as emotionally disturbed and socially maladjusted children. Indeed, informal evaluation of the Taxonomy project in its formative stages indicates that significant reading score gains in the Treatment group of this experiment should be expected.

Hypotheses

This literature suggests the primary hypothesis of the experiment: Those children, students from a New York City school for emotionally disturbed and socially maladjusted children, whose teachers receive direct help in taxonomic teaching and materials classification from a resource staff will show significantly higher post-treatment reading scores after a four month period than will children from a similar population whose teachers have not received the aforementioned help from the resource staff.

A secondary hypothesis is also suggested: If teachers receive

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[1]Melvin Roman, Reaching Delinquents Through Reading (Springfield, Illinois: Charles C Thomas, 1957).

taxonomic teaching orientation and help from a resource staff, the students of those teachers receiving more extensive help will score significantly higher post-treatment reading scores than the students of those teachers receiving minimal taxonomic teaching orientation and help.

Without hypothesis and for purposes of description and later discussion, it was also the purpose of this experiment to correlate all reading score gains with measures of intelligence, student involvement in various activities of the Taxonomy of Instructional Treatments, and heterogeneity of materials utilized by the teacher.

CHAPTER III

PROCEDURE

Public School 9 and Public School 148 of Queens, New York City, were selected to provide the setting for the research because of their close proximity (within two miles of each other) and their similar student populations, programs and philosophies. The administrators of both schools, principals for ten and twelve years, respectively, in the "600" schools of New York City, considered their schools to be "typical '600' schools." They communicated with each other regularly and expressed similar goals and methods.

Public School 9 contained the average "600" school enrollment of 100 pupils, with the predominant ethnic composition (80 percent Negro, 15 percent Puerto Rican, 5 percent Caucasian). It contained a faculty of twelve male homeroom teachers, whose average length of employment in Public School 9 was approximately three years. The school employed a two-fifths time school psychologist, provided by the New York City Board of Education's Bureau of Child Guidance. Children of Public School 9 also had the services of a guidance counsellor available to them at all times. Psychiatric consultation was provided one hour per week to assist the faculty in the management of the children. The principal of Public School 9 also secured occasional consultant help for his teachers from the faculty of Teachers College, Columbia University. Nine classes and their homeroom teachers were randomly selected from the twelve classes and

homeroom teachers of Public School 9 to become the two treatment groups and a control group for the experiment.

Public School 148 was smaller in size (seventy-three pupils) than Public School 9, yet its ethnic ratios were identical. The faculty included eight homeroom teachers (one female) and a remedial reading teacher. This school also employed a full-time guidance counselor, and the services of a school psychiatrist were provided to the faculty three hours per week. Fifty-five children from all classes, who fulfilled attendance requirements, participated in the experiment as a second control group for the experiment.

Students of both schools were boys between the ages of nine and fourteen. Both schools grouped students according to estimates of reading abilities and most classes had age spans of about three years. The median student age at both schools was twelve years and five months.

All children admitted to the two schools met the criteria for screening, described by the New York City Board of Education as follows:

1. Criteria for Admission
   - 1.1 School grade placement in grades 5 through 12 (girls 7-12).
   - 1.2 An intelligence level above that provided for by the program for Children with Retarded Mental Development as determined by a psychologist.
   - 1.3 A history of repeated disruptive and aggressive behavior, extensive in scope and serious in nature, which either endangers the safety of the pupils or others, or seriously interferes with the routine learning in the classroom.
   - 1.4 A history of truancy, if coupled with aggressive and disruptive behavior.

> 1.5 The failure of the pupil to respond to extensive and intensive efforts by the home school to help him, and the exhaustion of the resources of that school for the adjustment and therapy of that individual pupil.[1]

Perusal of clinical records of the students in the sample school showed confirmation of these criteria for admission. There were histories of marked anti-social behavior in the majority of students, a measured or potential intelligence level in the average and above average range, and few indications of psychoses or severe psychoneuroses. All histories showed truancies and erratic exposure to various school experiences. The educational achievement test scores of the students reflected gross underachievement in the area of reading.

Two variations of teaching reading through the use of "The Taxonomy of Instructional Treatments" were the two treatments: T_1 (maximum orientation) and T_2 (minimum orientation). For the six teachers involved in the T_1 and T_2 groups, a resource staff, housed at Public School 9, was made available to help them increase their competencies in teaching reading. The resource staff controlled the teachers' exposure to "The Taxonomy of Instructional Treatments" by systematic methods which are described later. For both the T_1 and T_2 groups, however, the resource staff had the overall objective of assisting the teachers in developing diagnostic teaching skills and increasing their repertoire of teaching materials and strategies.

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[1]"Screening Procedures for '600' Day Schools," Board of Education of the City of New York, Special Circular No. 8, 1961-62.

The resource staff was composed of the following:

1. Three diagnosticians/in-service trainers. It was the function of these persons to work with the faculty being served, both in individual and group settings, to teach them the skills of diagnostic teaching and the relationship of diagnostic findings to material and method selection. These diagnosticians/in-service trainers utilized various methodologies to teach these skills and their articulation to the Taxonomic approach by individual consultations with teachers, demonstration teaching, analysis of teaching methodologies through formalized classroom observation, group meetings, and lectures. One of these persons acted as director of the resource staff, coordinating all activities of the staff and effecting liaison to the school administrator.

2. One remedial reading specialist. This person worked individually with teachers, under the supervision of a diagnostician/in-service trainer, to effect not only the skills of diagnostic teaching and taxonomic classification of materials and methods, but also to further delineate and demonstrate useful reading remediation techniques to teachers. This person also acted as remediation consultant to the staff and was responsible for testing children with standardized remedial reading tests when necessary. He assisted in the selection and procurement of remediation materials for use with the students.

3. One materials specialist. This staff member worked individually with teachers under the supervision of a diagnostician/

in-service trainer to improve the skills of diagnostic teaching and taxonomic classification of materials and methods. In addition, he catalogued the materials involved in the project according to the Taxonomy. He was further responsible for procuring new materials needed by the staff, along with the instructions and evaluation data on the material. This specialist had responsibility for developing materials when commercial resources were not available, and served as a resource to the staff and faculty regarding the correct procedures for the administration of instructional materials and methodologies.

4. One administrative assistant. Although serving the resource staff in secretarial, library, procurement, and test-scoring duties, he had no professional contact with either teachers or pupils. He sought to maintain catalogs of commercially produced instructional and remedial materials, and developed expeditious procedures of procurement. He searched all publications of the Special Education Instructional Materials Centers for material relevant to the staff's needs.

The evaluator was not a part of the resource staff. He collected data for the evaluation experiment and related only to the resource staff in terms of maintaining consistency of design, test and observer reliability, and testing schedules.

The resource staff, three of whom had been with the taxonomic project since its inception, underwent extensive training in the use of the Taxonomy of Instructional Treatments. The content of their training was written by Dr. Sandford Reichart, the Associate Director

of the Taxonomic Instruction Project, who also trained them.[1] In addition, resource staff members were instructed by the evaluator in the proper administration and scoring of all tests used in the project. During this period, which preceded the opening of school by two weeks, and during the teacher strike of eleven weeks the staff practiced scoring observations until reliability reached .96.

The six teachers included in the treatment administered populations were picked randomly from the Public School 9 faculty. They agreed to participate in the experiment, for which they received a small stipend (as did the control group teachers in this school). All classes were self-contained. The median class size was seven. Students were assigned to teachers on the basis of date of admission, vacancy in the classes, considerations of chronological age and reading level. Only those children were included in the data who were available for testing during the entire school year.

Table 1 displays the differing nature of activities carried on within each of the treatment and control groups. Pre- and post-treatment tests (pp. 27-31) were administered to all groups and are then not included as activities described by this table.

The T_1 (maximum orientation) group consisted of three teachers and twenty children. Teachers of the T_1 group were expected to allow the resource staff members into their room during the reading period

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[1]Reichart, et al., The Taxonomic Instruction Project (First Report), pp. 171-221.

TABLE 1

NATURE OF ACTIVITIES IN TREATMENT GROUPS (T_1 AND T_2) AND CONTROL GROUPS (C_1 AND C_2)

Group	Orientation to Taxonomy of Instructional Treatments	Demonstration of Adaptation of Taxonomy of Instructional Treatments to Individual Students	Use of Resource Materials Center	Classroom Observation by Staff Using Classroom Observation Analysis Scale
T_1 (maximum orientation)	Taught	Extensive	Extensive	Observation with feedback to teacher
T_2 (minimum orientation)	Taught	None	Minimal	Observation with feedback to teacher
C_1	Not Taught	None	Rare	Observation with no feedback
C_2	Not Taught	None	None	None

each day and to spend two or three hours per week during their after-school time with resource staff members. Resource staff members observed the teacher teaching reading, made systematic analysis of the students' participation in reading activities through the Classroom Observation Analysis Sheet, and demonstrated additional teaching techniques and strategies to the teachers using the teachers' own students. In conferences, the resource staff taught the teachers all the terms of the "Taxonomy of Instructional Treatments" and related to the teacher the results of his observations. The resource staff encouraged the teachers to adopt differing methods and strategies, as their observations suggested. They utilized these suggestions as the basis for their demonstrations in the classroom. The resource staff thoroughly oriented the teachers in T_1 to the reading instructional materials attached to the project, suggested new materials to the teachers, and showed them how to find and classify reading materials by the terms of the Taxonomy.

The T_2 (minimum orientation) group consisted of three teachers and nineteen children. These teachers had access to the resource staff the same amount of time as did the T_1 group. The resource staff entered the teachers' rooms during the reading period and analyzed reading participation using the Classroom Observation Analysis Sheet (Appendix B). The resource staff met with the teachers in after-school hours and taught them the vocabulary of the Taxonomy, discussing with them, in taxonomic terms, the classroom observations. For the T_2 group, however, the resource staff did not make suggestions

based on their observations, did not demonstrate new teaching strategies or methods to the teachers, and did not encourage the use of the instructional materials center. The resource staff did, however, orient the teachers of T_2 to the instructional materials center and made it accessible to them. The purpose of differentiated treatments between the T_1 and T_2 groups was to control possible teaching effects of the resource staff in the measurement of treatment effectiveness, i.e., reading score improvement. It was further felt that such a differentiation might offer implications for determining whether taxonomic teaching had to be intensively taught to teachers or whether it might be introduced, in a short time, as a tool which the teacher might effectively use at his own discretion.

The C_1 group, a control group, was also drawn randomly from the faculty of Public School 9. The teachers of this group received no instruction or communication from the resource staff. Teachers in the group were, however, permitted to borrow any material they desired from the resource library on their own initiative. Very little of such borrowing was effected, however. This group numbered three teachers and sixteen students.

The C_2 group consisted of thirty students and seven teachers from Public School 148 in Queens. The teachers of these children received no help from the resource staff, nor was the library of instructional materials available to them. The concept of taxonomic teaching was never explained to this staff.

Table 2 lists the characteristics of the populations being

measured. Appreciable differences in P.P.V.T. and achievement scores were taken into account in analysis of test score differences.

TABLE 2

CHARACTERISTICS OF SAMPLE GROUPS

Group Name	School	No. of Teach.	No. of Stud.	Read. Scores Grade Level Equivalent[a] Vocab.	Comp.	PPVT Mean I.Q.	PPVT S.D.
T_1	PS 9	3	20	3.1	3.2	90.5	12.8
T_2	PS 9	3	19	4.8	4.5	95.6	16.0
C_1	PS 9	3	16	2.7	2.6	85.6	11.2
T_1, T_2, C_1				3.5	3.4	90.8	13.9
C_2	PS 148	7	30	3.3	3.1	81.8	9.9
Total		16	85	3.5	3.3	86.3	13.4

[a]Fall, 1968, Gates-MacGinitie Tests of Reading.

To test the primary hypothesis (significant difference in post-treatment reading scores between Treatment and Control groups), all students in all groups received pre-treatment tests of reading ability. Both the Vocabulary and Comprehension sections of the Gates MacGinitie Tests of Reading, Tests B and C (according to reading level), Form 1, were administered to classes in group testing situations according to the manual of instructions and were monitored by the teacher of the

class and two resource staff members. Children not present for this group testing, although in school, were tested in small groups in the resource staff offices. A battery of tests made by the resource staff was next administered individually to each student. This battery (see Appendix B) included tests for letter names, letter sounds (common phonic interpretations), vowel names, short sound vowel production, long sound vowel production, short sound vowel auditory recognition, long sound vowel auditory recognition, two-letter consonant blends, three-letter consonant blends, knowledge of the "rule of final e," vowel blends, compound words, production of the capital letters of the alphabet, production of the lower case letters of the alphabet, initial consonant recognition and final consonant recognition. The Wepman Auditory Discrimination Test, Form 1, was also administered at the time of individual testing for reading scores. The testing was done by the researcher assigned to the project and the resource staff.

After the period of exposure to the treatment or control conditions, all subjects were retested on the same staff-made battery of tests, Form 2 (equivalent of Form 1) of the Gates-MacGinitie Tests of Reading, and Form II (equivalent of Form I) of the Wepman Auditory Discrimination Test. In addition to the reading tests, the Peabody Picture Vocabulary Test was administered to all subjects.

To provide additional information about pre- to post-treatment differences, further data of a descriptive nature were gathered on groups T_1, T_2, and C_1 during the treatment phase of the experiment.

These measures were: (1) an observational time analysis of the subject's involvement in any phase of the Taxonomy during the reading session of the school day; and (2) a listing of the materials used during the observational period. The observations occurred twice weekly during randomly selected days of the week (Monday through Thursday). The measurement instrument consisted of cells labelled with the seven major categories of the Taxonomy as defined by two minute time intervals (see Appendix B).

Each subject's reading activity in class was given a taxonomic number of seven digits (each major category was described by a sub-category digit describing the subject's behavior according to that parameter). An observation of each subject was performed every two minutes, and the time of each subject's activity in any configuration of the Taxonomy was noted.

While observing the subject, the observer also noted which and how many instructional materials were being utilized by the subject. These data, summarized for the use of the resource staff, and quantified and averaged for research purposes, provided a Materials Index measure of heterogeneity of materials for each subject.

The activities of the experiment were thus phased as follows:

Phase One: Pre-treatment test for reading. This phase took six weeks at the beginning of the school year. Any child who entered school during this period received all tests and was included in the data. Students entering school after this date received some of the tests (at the request of the teachers) but were excluded from the

data of the experiment. Prior to the testing period, the resource staff members met all teachers, practiced classroom observation, and received detailed instruction in testing to insure consistency of test results. Assignment of resource staff members to individual T_1 (maximum orientation) or T_2 (minimum orientation) teachers for the in-service aspect of the Treatments was made by the Director on the basis of his assessment of potential for meaningful dialogue between staff member and teacher.

Phase Two: Treatments. This phase encompassed approximately five months. During this period the resource staff worked intensively with the T_1 (maximum orientation) and T_2 (minimum orientation) group teachers to instruct them in (1) the process of diagnostic teaching; (2) the delineation of information about the child into the terms of the "Taxonomy of Instructional Treatments"; (3) the use of the Taxonomy to plan meaningful methods and/or materials for any child; and (4) the correct way to use previously untried materials and methods. The resource staff utilized any teaching methods available to them to teach the required concepts to the T_1 and T_2 group teachers. Each staff member visited the reading session of his assigned teacher three times per week. During two visits he completed a Classroom Observational Analysis Sheet for thirty minutes. Twice a week the treatment group teacher met with his assigned resource staff member who gave him "feedback" about the progress of his students, observations of student behavior, and suggestions for various methods or diagnostic procedures. All materials were

labeled according to the vocabulary of the Taxonomy. If a teacher wished to utilize new strategies and/or material as the result of increased insight about subjects, the resource staff sought to provide it for him (depending, of course, on whether the teacher was in group T_1 or T_2), either from commercial sources or through development by the resource staff. When new materials were created, the teacher for whom they were intended was asked to participate in their development in order to acquaint him with the principles of materials construction for the future.

Phase Three: Post-treatment reading tests. During this phase of approximately three weeks at the end of the school year, the reading tests were re-administered in the same sequence and manner. They were administered to all students in the treatment and control groups, but only scores of those students who had been administered all tests of phase one were included in the data.

Treatment of Results

The tests of the major hypothesis were analyses of covariance, using the post-treatment raw scores of the Gates-MacGinitie Vocabulary and Comprehension Tests and holding constant first the pre-treatment raw scores of these tests and second the I.Q. scores of the Peabody Picture Vocabulary Test. If significant F ratios were found in both analyses of covariance, Scheffe tests were used to determine the location and direction of the significant difference between group means. The level of significance for the testing of the major

hypothesis was .10. This significance level, less rigorous than that usually employed, was selected because of the exploratory and "field" aspects of this research.

For further exploration of the major hypothesis, analyses of covariance were computed for the post-treatment raw scores of all staff-made tests (variables one through sixteen) and the post-treatment raw scores of the Wepman Auditory Discrimination Test (variable seventeen) holding constant: (1) pre-treatment scores; (2) the Gates-MacGinitie Vocabulary post-treatment raw scores; (3) the Gates-MacGinitie Comprehension post-treatment raw scores; and (4) the Peabody Picture Vocabulary Test I.Q. scores. Because the staff-made tests were non-standardized a more conservative significance level of .05 was adopted for the interpretation of significance.

Finally, for explorational purposes, correlations between the pre- to post-treatment difference scores, the Peabody Picture Vocabulary Test I.Q. scores, a Materials Index, and the percentage of time spent in each taxonomic cell (as measured by the Classroom Observational Analysis Sheet) were computed. This matrix was meant to suggest relationships between student reading activities and reading test gains.

CHAPTER IV

RESULTS

Nature of Data

Appendix C summarizes the nature of the data. It identifies the variables, hereafter labeled by variable number, and states the type of scores for each variable. Since all data were not obtained from all subjects, Appendix C also delineates which groups contributed data.

The first nineteen variables are measurements obtained from all subjects of the experiment. Variables one through sixteen measured the elements of a battery of reading tests developed by the staff of this experiment. Variable seventeen measured the errors of a subject taking the Wepman Auditory Discrimination Test. The Gates-MacGinitie Reading Vocabulary and Comprehension Test scores are represented in variables eighteen and nineteen. The scores of variable twenty are I.Q. conversions of the raw scores of the Peabody Picture Vocabulary Test. For the tests of the major hypothesis and exploratory tests of relationship between the first nineteen variables, raw scores were used. A correlational analysis, using pre-treatment to post-treatment difference scores, summarized in Appendix D, was examined to develop implications about the observed post-test raw score differences between groups.

Variables twenty-one through seventy-two represent scores

converted from the observations of classes in groups T_1, T_2 and C_1. Variable twenty-one represents, for an individual, an average of the number of reading materials he utilized in any reading session and is labeled the Materials Index. Variables twenty-two through seventy-two represent cells of the Taxonomy. Individual scores within these cells represent the percentage of all observation time that a subject was observed in the activities described by this cell.

Not all of the Taxonomy cells were included in the data analysis (see Appendix A). This omission occurred because several of the categories were used so infrequently by the subjects that statistical analysis would have been invalid. Therefore, the categories of Cognitive-Perceptual: memory span, time relationships and space relationships; Study Skills: skimming, references and tests, maps and graphs; and Aesthetic Expression: reception were not included in the data.

Role of Intelligence

In order to evaluate the role of intelligence in determining reading score gains, Pearson r's were computed between the Peabody Picture Vocabulary Test I.Q. score and all difference scores between pre- and post-treatment reading tests. Table 3 summarizes the results of these calculations.

Table 3 shows that I.Q. scores, as measured by the PPVT, have no significant correlation with Gates-MacGinitie Vocabulary and Comprehension pre- to post-treatment test score differences

TABLE 3

CORRELATION (PEARSON r) BETWEEN I.Q. SCORES OF PEABODY PICTURE VOCABULARY TEST AND PRE- TO POST-TREATMENT READING TEST GAIN SCORES

Variable	T_1	T_2	C_1	T_1, T_2, C_1	C_2
1	.2239	-.2582	.1845	.1140	.2277
2	.1245	-.4433	-.1436	-.1536	.0334
3	.0000	.0000	.0000	.0000	-.1657
4	.3854	-.1366	-.1004	.0276	.2351
5	.2153	-.4863*	-.3066	-.1896	-.1164
6	.4060	.0913	-.5430*	.0140	.0808
7	.3457	.0000	-.3290	.0835	-.1187
8	.2339	-.1149	.1115	.0305	.1761
9	.2967	.4308	.1248	.2335	.1931
10	.1150	.2233	.5017*	.1639	-.1166
11	-.1801	-.2101	.1356	-.0880	.1197
12	-.0148	.0214	-.3383	-.0311	.1649
13	-.2843	.1827	-.0486	-.0551	.1966
14	-.3183	-.0676	.1030	-.1043	.1953
15	-.1251	-.2466	-.4785	-.1836	-.0098
16	-.1020	-.1886	-.1073	-.0854	.0189
17	.0578	.0779	-.1603	-.0082	.0200
18	.2864	.1096	-.1999	-.0816	.0890
19	-.0275	.1451	-.2545	-.0223	.0610

*Significant at <.05

(variables eighteen and nineteen), and have only negligible relationship to reading skills as measured by the staff-made reading tests. With only three significant correlations in a matrix of ninety-five scores (T_2 in long sound vowel production, C_1 in short sound vowel recognition, and C_1 in rule of final "e"), all significances could be attributed to the operation of chance factors. Thus, for this sample and this battery of instruments there seems to be little evidence that intelligence is related to reading score gains.

Nature of Variable Scores

Table 4 displays the Range (number of possible answers), raw score Mean and Standard Deviation of the pre-treatment and post-treatment scores of variables one through nineteen for all groups. All variables, except variable seventeen, which represents number of errors, reported scores in number of answers correct.

The major hypothesis of this experiment was that post-treatment reading test scores would be significantly higher for those students whose teachers had received help using the Taxonomy of Instructional Treatments than for those students whose teachers had not received such help. The test of this hypothesis depended upon an analysis of covariance of these scores, holding constant both pre-test scores and PPVT I.Q. scores. Further descriptive analyses of the scores of these tests, based on Pearson r correlations between the pre-treatment and post-treatment raw scores, were made to determine their relative stability. Table 5 summarizes the results of these correlations.

TABLE 4

RANGE, MEAN AND STANDARD DEVIATION OF VARIABLES 1-19
(RAW SCORES)

		T_1			
Variable	Possible Range	Pre-Treatment Mean	S.D.	Post-Treatment Mean	S.D.
1	24	21.00	.2293	20.55	1.000
2	26	13.25	6.1558	18.30	2.7625
3	5	5.00	0.0000	5.00	0.0000
4	5	1.10	1.5559	2.75	1.8353
5	5	3.45	2.1884	3.30	2.1275
6	5	2.15	1.7917	3.15	1.5389
7	5	4.50	1.5389	4.95	0.2293
8	19	8.05	6.0914	13.35	5.3655
9	6	1.15	1.5043	1.95	2.1764
10	10	6.45	2.7047	7.00	3.1953
11	14	8.75	3.0949	9.55	4.6054
12	8	3.80	2.7434	4.30	3.1455
13	26	23.15	4.7848	23.45	2.4387
14	26	22.55	4.7627	22.50	4.0717
15	18	14.55	3.9000	15.95	2.8190
16	11	9.80	2.4602	9.70	1.5217
17	30	5.25	2.4920	4.20	3.2525
18	48	31.45	10.4954	34.50	10.6573
19	48	24.05	9.3272	26.45	10.1175

TABLE 4--Continued

	T_2			
	Pre-Treatment		Post-Treatment	
Variable	Mean	S.D.	Mean	S.D.
1	19.95	2.3921	20.89	0.3333
2	17.11	5.1099	18.32	2.8577
3	5.00	0.0000	5.00	0.0000
4	3.00	1.6666	2.95	2.0682
5	3.84	1.9578	4.16	1.7794
6	3.11	1.7638	2.26	1.4907
7	5.00	0.0000	5.00	0.0000
8	12.05	6.7618	15.00	4.3461
9	2.58	2.2484	3.16	2.4152
10	7.05	3.0092	8.26	2.5166
11	11.05	4.3525	11.68	3.8005
12	5.37	2.6874	5.95	2.4607
13	23.21	4.4284	24.00	3.0368
14	23.00	3.8729	24.11	2.7284
15	16.84	1.8408	17.74	1.2018
16	10.42	1.0800	10.47	0.9128
17	5.47	3.7043	4.42	4.6127
18	35.63	12.1482	37.58	9.4593
19	30.84	13.0096	34.21	12.8174

TABLE 4--Continued

	C_1			
Variable	Pre-Treatment Mean	S.D.	Post-Treatment Mean	S.D.
1	21.38	2.4221	20.56	0.7302
2	14.50	4.0987	14.69	6.5726
3	5.00	0.0000	5.00	0.0000
4	1.94	1.8797	1.25	1.4375
5	3.13	2.1908	2.94	2.3804
6	2.69	1.9493	1.38	1.5916
7	4.06	2.0165	5.00	0.0000
8	6.25	6.2021	8.06	4.9866
9	1.50	2.3944	1.00	1.5055
10	5.13	2.8751	5.69	2.9097
11	7.13	4.9531	7.81	4.4422
12	2.31	2.3522	3.56	2.3380
13	20.56	5.8080	21.25	1.0645
14	20.25	7.1227	21.38	4.6475
15	14.38	3.9832	16.19	2.9211
16	9.31	1.5705	9.75	2.1134
17	5.94	3.6787	4.19	2.1602
18	29.13	10.1382	30.56	9.8723
19	18.19	11.1308	21.88	10.5063

TABLE 4--Continued

Variable	C_2			
	Pre-Treatment		Post-Treatment	
	Mean	S.D.	Mean	S.D.
1	20.30	1.3645	20.37	0.8905
2	16.17	3.1840	16.73	2.5461
3	4.94	0.1854	4.80	0.9284
4	.83	1.5974	.80	1.2730
5	2.07	2.1971	2.27	2.2742
6	1.27	1.1446	1.13	1.0338
7	4.33	0.5570	4.83	0.7427
8	7.63	5.4677	10.70	5.9073
9	1.13	1.7714	1.40	1.7120
10	5.73	2.9478	6.33	3.2536
11	4.23	4.5825	8.80	4.6050
12	3.20	2.2205	3.93	2.2893
13	20.33	6.2062	21.07	5.5522
14	20.07	6.1644	20.20	5.8633
15	16.43	2.0085	16.33	2.2666
16	9.47	1.7907	9.60	2.0085
17	4.07	3.1568	4.20	2.9065
18	30.63	10.6657	32.73	9.3363
19	22.87	11.1964	25.43	11.2055

TABLE 5

PEARSON r CORRELATIONS BETWEEN PRE- AND POST-TREATMENT RAW SCORES ON GATES-MAC GINITIE READING TESTS

	Gates-MacGinitie	
Group	Vocabulary	Comprehension
T_1	.900*	.816*
T_2	.921*	.898*
C_1	.858*	.978*
T_1, T_2, C_1	.895*	.913*
C_2	.906*	.872*
T_1, T_2, C_1, C_2	.899*	.900*

*Significant at <.05

Examination of Table 5 indicates that the pre-treatment and post-treatment raw scores of the Gates-MacGinitie Reading Tests show significant correlations. This would serve to support a contention that the measure is, indeed, testing a reasonably stable variable.

Tests of Major Hypothesis

The Gates-MacGinitie Reading Test was chosen as the instrument to test the major hypothesis of this experiment because of its standardization and high reliability.[1] Table 6 displays the analyses of covariance of the post-treatment raw scores holding constant first the pre-treatment raw scores and then the PPVT I.Q. scores.

Table 6 shows that there is no significant effect on reading vocabulary scores attributable to the treatment effects when the effects of prior testing and intelligence are held constant.

A significant *F* ratio was obtained for post-treatment reading comprehension scores when PPVT scores were held constant. However, when pre-treatment scores were held constant the significant *F* ratio was not obtained. Thus the findings of Table 6 as they relate to the major hypothesis show no significant treatment effects.

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[1] A. I. Gates and W. H. MacGinitie, Technical Manual for the Gates-MacGinitie Reading Tests (New York: Teachers College Press, Teachers College, Columbia University, 1965).

TABLE 6

ANALYSES OF COVARIANCE COMPARING MEAN POST-TREATMENT RAW SCORES OF GROUPS T_1, T_2, C_1 AND C_2 ON GATES-MACGINITIE VOCABULARY AND COMPREHENSION TESTS HOLDING CONSTANT PRE-TREATMENT SCORES AND PPVT I.Q. SCORES

Variable	Holding Constant	Source	s.s.	d.f.	m.s.	F
Gates-MacGinitie--Vocabulary	Pre-Treatment	Between Groups	45.40	3	15.13	.79
		Within Groups	1533.77	80	19.17	
	PPVT	Between Groups	339.41	3	113.14	1.18
		Within Groups	7679.65	80	96.00	
Gates-MacGinitie--Comprehension	Pre-Treatment	Between Groups	38.37	3	12.79	.47
		Within Groups	2165.60	80	27.07	
	PPVT	Between Groups	76.00	3	325.33	2.64*
		Within Groups	9873.00	80	123.41	

*Significant at <.10

Further Exploration of Post-Treatment Reading Scores

In addition to testing the major hypothesis with Gates-MacGinitie Vocabulary and Comprehension scores, the treatment and control groups were compared in post-treatment scores on a battery of non-standardized staff-made tests and the Wepman Auditory Discrimination Test. Analyses of covariance of the post-treatment scores were computed four times for each of the seventeen variables, holding constant, in turn, the pre-treatment scores, the Gates-MacGinitie Vocabulary post-treatment scores, and the PPVT I.Q. scores. Table 7 summarized the results of these computations.

It can be seen from Table 7 that variables two, four, six and eight show significant F ratios under all four covariance conditions. Scheffé Tests were computed for post-treatment raw score means in order to delineate the direction and location of differences.

Tables 8 through 11 display the results of the raw score post-treatment Scheffé tests for variables two, four, six and eight respectively. Actual Means for these variables appear in Table 4.

Table 8 demonstrates that the means of T_1 and T_2 are significantly greater than C_1 for this variable. Although the strict form of the secondary hypothesis, i.e., $T_1 > T_2 > C_1$ or C_2, is not substantiated, the results indicate an impact of both forms of treatment as compared to at least one of the control conditions.

According to Table 9 the means of T_1 and T_2 are significantly greater than C_1 or C_2 under all covariance conditions. In this case

TABLE 7

ANALYSES OF COVARIANCE COMPARING MEAN POST-TREATMENT RAW SCORES OF GROUPS T_1, T_2, C_1 AND C_2 ON VARIABLES 1-17 HOLDING CONSTANT PRE-TREATMENT RAW SCORES OF THOSE VARIABLES, THE GATES-MACGINITIE VOCABULARY AND COMPREHENSION TESTS, AND PPVT I.Q. SCORES

Variable	Hold. Const.	Source	s.s.	d.f.	m.s.	F
1	Pre-T.	Between Groups	3	3	1.00	1.54
		Within Groups	52	80	.65	
	GM--V	Between Groups	2	3	.67	1.14
		Within Groups	47	80	.59	
	GM--C	Between Groups	2	3	.67	1.12
		Within Groups	48	80	.60	
	PPVT	Between Groups	3	3	1.00	1.54
		Within Groups	52	80	.65	
2	Pre-T.	Between Groups	174	3	58.00	6.05*
		Within Groups	767	80	9.59	
	GM--V	Between Groups	144	3	48.00	3.41*
		Within Groups	1126	80	14.08	
	GM--C	Between Groups	113	3	38.00	2.76*
		Within Groups	1100	80	13.75	
	PPVT	Between Groups	138	3	46.00	3.27*
		Within Groups	1125	80	14.06	
3	Pre-T.	Between Groups	1	3	.33	1.06
		Within Groups	25	80	.31	
	GM--V	Between Groups	1	3	.33	1.06
		Within Groups	25	80	.31	
	GM--C	Between Groups	1	3	.33	1.06
		Within Groups	25	80	.31	
	PPVT	Between Groups	0	3	.00	.31
		Within Groups	25	80	.31	

TABLE 7--Continued

Variable	Hold. Const.	Source	s.s.	d.f.	m.s.	F
4	Pre-T.	Between Groups	59	3	19.67	7.71*
		Within Groups	204	80	2.55	
	GM--V	Between Groups	73	3	24.33	9.01*
		Within Groups	216	80	2.70	
	GM--C	Between Groups	66	3	22.00	8.18*
		Within Groups	215	80	2.69	
	PPVT	Between Groups	55	3	18.33	6.84*
		Within Groups	214	80	2.68	
5	Pre-T.	Between Groups	29	3	9.67	2.08
		Within Groups	371	80	4.64	
	GM--V	Between Groups	36	3	12.00	2.59
		Within Groups	371	80	4.64	
	GM--C	Between Groups	30	3	10.00	2.17
		Within Groups	368	80	4.60	
	PPVT	Between Groups	19	3	6.33	1.41
		Within Groups	360	80	4.50	
6	Pre-T.	Between Groups	51	3	17.00	9.04*
		Within Groups	151	80	1.88	
	GM--V	Between Groups	53	3	17.67	9.25*
		Within Groups	153	80	1.91	
	GM--C	Between Groups	53	3	17.67	9.35*
		Within Groups	151	80	1.89	
	PPVT	Between Groups	52	3	17.33	9.07*
		Within Groups	153	80	1.91	

TABLE 7--Continued

Variable	Hold. Const.	Source	s.s.	d.f.	m.s.	F
7	Pre-T.	Between Groups	1	3	.33	1.57
		Within Groups	17	80	.21	
	GM--V	Between Groups	1	3	.33	1.57
		Within Groups	17	80	.21	
	GM--C	Between Groups	1	3	.46	2.42
		Within Groups	15	80	.19	
	PPVT	Between Groups	1	3	.33	1.57
		Within Groups	18	80	.21	
8	Pre-T.	Between Groups	298	3	99.33	5.05*
		Within Groups	1574	80	19.68	
	GM--V	Between Groups	336	3	112.00	5.51*
		Within Groups	1626	80	20.32	
	GM--C	Between Groups	201	3	67.00	3.15*
		Within Groups	1702	80	21.27	
	PPVT	Between Groups	434	3	144.67	5.10*
		Within Groups	2270	80	28.38	
9	Pre-T.	Between Groups	29	3	9.67	2.85*
		Within Groups	271	80	3.39	
	GM--V	Between Groups	38	3	12.67	3.39*
		Within Groups	297	80	3.74	
	GM--C	Between Groups	24	3	8.00	2.23
		Within Groups	287	80	3.59	
	PPVT	Between Groups	54	3	18.00	4.64*
		Within Groups	310	80	3.88	

TABLE 7--Continued

Variable	Hold. Const.	Source	s.s.	d.f.	m.s.	F
10	Pre-T.	Between Groups	13	3	4.33	1.27
		Within Groups	273	80	3.41	
	GM--V	Between Groups	12	3	4.00	.90
		Within Groups	353	80	4.42	
	GM--C	Between Groups	4	3	1.33	.28
		Within Groups	385	80	4.82	
	PPVT	Between Groups	55	3	18.33	1.98
		Within Groups	741	80	9.26	
11	Pre-T.	Between Groups	11	3	3.67	2.16
		Within Groups	136	80	1.70	
	GM--V	Between Groups	18	3	6.00	.87
		Within Groups	553	80	6.91	
	GM--C	Between Groups	4	3	1.33	.17
		Within Groups	640	80	8.00	
	PPVT	Between Groups	121	3	40.33	2.05
		Within Groups	1571	80	19.64	
12	Pre-T.	Between Groups	- 1	3	- .33	- .15
		Within Groups	182	80	2.27	
	GM--V	Between Groups	15	3	5.00	1.63
		Within Groups	246	80	3.07	
	GM--C	Between Groups	4	3	1.33	.39
		Within Groups	274	80	3.43	
	PPVT	Between Groups	41	3	13.67	2.10
		Within Groups	520	80	6.50	

TABLE 7--Continued

Variable	Hold. Const.	Source	s.s.	d.f.	m.s.	F
13	Pre-T.	Between Groups	18	3	6.00	.58
		Within Groups	824	80	10.30	
	GM--V	Between Groups	60	3	20.00	1.24
		Within Groups	1288	80	16.09	
	GM--C	Between Groups	62	3	20.67	1.18
		Within Groups	1402	80	17.52	
	PPVT	Between Groups	701	3	233.67	2.74
		Within Groups	6734	80	85.15	
14	Pre-T.	Between Groups	57	3	19.00	1.58
		Within Groups	964	80	12.05	
	GM--V	Between Groups	104	3	34.67	1.79
		Within Groups	1550	80	19.37	
	GM--C	Between Groups	48	3	16.00	.82
		Within Groups	1569	80	19.62	
	PPVT	Between Groups	120	3	40.00	1.83
		Within Groups	1751	80	21.89	
15	Pre-T.	Between Groups	16	3	5.33	1.84
		Within Groups	231	80	2.89	
	GM--V	Between Groups	32	3	10.67	1.96
		Within Groups	435	80	5.44	
	GM--C	Between Groups	13	3	4.33	.87
		Within Groups	396	80	4.95	
	PPVT	Between Groups	44	3	14.67	2.77*
		Within Groups	423	80	5.29	

TABLE 7--Continued

Variable	Hold. Const.	Source	s.s.	d.f.	m.s.	F
16	Pre-T.	Between Groups	3	3	1.00	.35
		Within Groups	230	80	2.88	
	GM--V	Between Groups	3	3	1.00	.34
		Within Groups	232	80	2.90	
	GM--C	Between Groups	1	3	.33	.11
		Within Groups	233	80	2.91	
	PPVT	Between Groups	6	3	2.00	.66
		Within Groups	242	80	3.02	
17	Pre-T.	Between Groups	13	3	4.33	.55
		Within Groups	630	80	7.88	
	GM--V	Between Groups	- 15	3	- 5.00	- .48
		Within Groups	832	80	10.40	
	GM--C	Between Groups	25	3	8.33	.88
		Within Groups	761	80	9.51	
	PPVT	Between Groups	8	3	2.67	.24
		Within Groups	874	80	10.93	

*Significant at <.05

TABLE 8

SCHEFFÉ CRITICAL DIFFERENCE TEST FOR CONTRASTS AMONG POST-TREATMENT MEANS (RAW SCORE DATA) OF VARIABLE 2 (LETTER SOUNDS)

	T_2	C_1	C_2
		*	
		**	
		***	
		****	
T_1	.02	3.61	1.57
		*	
		**	
		***	
		****	
T_2		3.63	1.59
			*
C_1			2.04

*Significant at <.05 (C.D. = 1.72) Pre-treatment scores held constant.

**Significant at <.05 (C.D. = 2.08) Pre-treatment Gates-MacGinitie Vocabulary Scores held constant.

***Significant at <.05 (C.D. = 2.06) Pre-treatment Gates-MacGinitie Vocabulary Scores held constant.

****Significant at <.05 (C.D. = 2.07) Peabody Picture Vocabulary Test Scores held constant.

TABLE 9

SCHEFFÉ CRITICAL DIFFERENCE TEST FOR CONTRASTS AMONG POST-TREATMENT MEANS (RAW SCORE DATA) OF VARIABLE 4 (SHORT SOUND VOWEL PRODUCTION)

	T_2	C_1	C_2
		*	*
		**	**
		***	***
T_1		****	****
	.20	1.50	1.95
		*	*
		**	**
		***	***
T_2		****	****
		1.70	2.15
C_1			.45

*Significant at <.05 (C.D. = .88) Pre-treatment scores held constant.

**Significant at <.05 (C.D. = .91) Pre-treatment Gates-MacGinitie Vocabulary Scores held constant.

***Significant at <.05 (C.D. = .91) Pre-treatment Gates-MacGinitie Comprehension Scores held constant.

****Significant at <.05 (C.D. = .91) Peabody Picture Vocabulary Test Scores held constant.

the only deviation from the secondary hypothesis, i.e., $T_1 > T_2 > C_1$ or C_2, is in the finding that T_1 is not significantly greater than T_2.

Table 10 apparently supports the hypothesis that short sound vowel recognition will be significantly improved by the treatment. It also apparently supports the secondary hypothesis, that $T_1 > T_2 > C_1$ or C_2. A review of pre-treatment to post-treatment difference scores, however, reveals this finding to be somewhat misleading. Only T_1 gained in the improvement of short sound vowel recognition. All other groups lost ground in this skill. Therefore, the analysis really indicates that a positive treatment effect was limited to the T_1 group. T_2, C_1 and C_2 showed performance decrements from pre- to post-treatment testing.

Table 11 indicates that for skill acquisition in the learning of two-letter consonant blends the T_1 post-treatment means were significantly greater than the C_1 post-treatment means, and the T_2 post-treatment means were significantly greater than the post-treatment means of either C_1 or C_2 when all conditions were held constant. T_1 post-treatment means were not significantly greater than C_2 post-treatment means when PPVT I.Q. scores were held constant, a condition also found in comparing C_1 post-treatment means with C_2 post-treatment means. Such findings suggest the PPVT I.Q. scores may act as a confounding variable in this set of comparisons.

In summary, analyses of the seventeen staff-made reading tests and the Wepman Auditory Discrimination Test, while not being used to support the major hypothesis of the experiment, were shown to have

TABLE 10

SCHEFFÉ CRITICAL DIFFERENCE TEST FOR CONTRASTS AMONG POST-TREATMENT MEANS (RAW SCORE DATA) OF VARIABLE 6 (SHORT SOUND VOWEL RECOGNITION)

	T_2	C_1	C_2
	*	*	*
	**	**	**
	***	***	***
T_1	****	****	****
	.89	1.77	2.02

	*	*
	**	**
	***	***
T_2	****	****
	.88	1.13

C_1	.25

*Significant at <.05 (C.D. = .76) Pre-Treatment Scores held constant.

**Significant at <.05 (C.D. = .76) Pre-Treatment Gates-MacGinitie Scores held constant (Vocabulary).

***Significant at <.05 (C.D. = .76) Pre-Treatment Gates-MacGinitie Comprehension Scores held constant.

****Significant at <.05 (C.D. = .77) Pre-Treatment Peabody Picture Vocabulary Test Scores held constant.

TABLE 11

SCHEFFÉ CRITICAL DIFFERENCE TEST FOR CONTRASTS AMONG POST-TREATMENT MEANS (RAW SCORE DATA) OF VARIABLE 8 (TWO-LETTER CONSONANT BLENDS)

	T_2	C_1	C_2
T_1	1.65	5.29 * ** *** ****	2.65 * ** ***
T_2		6.94 * ** *** ****	4.30 * ** *** ****
C_1			2.64 * ** ***

*Significant at <.05 (C.D. = 2.46) Pre-treatment scores held constant.

**Significant at <.05 (C.D. = 2.50) Pre-treatment Gates-MacGinitie Vocabulary scores held constant.

***Significant at <.05 (C.D. = 2.55) Pre-treatment Gates-MacGinitie Comprehension scores held constant.

****Significant at <.05 (C.D. = 2.95) Pre-treatment Peabody Picture Vocabulary Test scores held constant.

relevance to the secondary hypothesis, i.e., $T_1 > T_2 > C_1$ or C_2. In no analysis was the strict form of the hypothesis supported. However, significant differences were in the directions indicated by the secondary hypothesis. That is, T_1 and T_2 were greater than C_1 or C_2. Such findings indicate that the Treatment groups showed significantly greater growth in skill acquisition for these four variables than did the Control group.

CHAPTER V

DESCRIPTIVE ANALYSES

For purposes of additional description, correlations were computed between variables one through twenty (staff-made tests, standardized tests and PPVT I.Q. scores) and variables twenty-one through seventy-two (Materials Use Index and observation scores for taxonomic cells). Significant correlations $p < .05$ were recorded. Tables 11 through 28 summarize these correlations. Variables three, eleven and forty-seven are not reported because the analyses revealed no significant correlations with taxonomic cells.

Table 12 shows the significant correlations of scores on the letter names variable (variable one) to the percentage of time spent in cells of the Taxonomy of Instructional Treatments (variables twenty-one through seventy-two). Correlations are delineated for T_1, T_2 and C_1 groups individually and in the aggregate. Positive correlations indicate that a higher percentage score of time spent in the taxonomic cell is related to a greater difference score in the direction of an increase in number of correct answers from pre-treatment to post-treatment testings. Conversely, a negative correlation indicates that a higher percentage score is associated with a difference score showing a decrease in number of correct answers from pre-treatment to post-treatment testing.

The interpretations given to the correlations may be found in Chapter VI under the heading "Exploratory Statistics."

TABLE 12

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 1 (LETTER NAMES) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
22	-.5458			-.4016
24	-.5956			
26				-.3329
29			-.5892	
31			-.6535	-.4016
41	-.6331			-.3376
45				.2885
51				.3230
53			-.5678	
55	-.5289			
56	-.5490			
66	-.6245			
67	-.5307			
68	-.6949			
72	-.4967			-.2725

The T_1 group scores showed only negative significant correlations between variable one and percentage scores in the cells of Cognitive-Perceptual: symbolic discrimination (variable twenty-two), Language Analysis: consonants (variable twenty-four), Sequential Level: grade two and below (variable forty-one), Instructional Mode: play-chance (variable fifty-five) and play-competition (variable fifty-six), Communication Input: visual-kinesthetic (variable sixty-six), auditory-kinesthetic (variable sixty-seven) and visual-auditory-kinesthetic (variable sixty-eight), and Communication Output: oral-motoric response (variable seventy-two).

There were no significant correlations in the T_2 group scores.

In the C_1 group there were three correlations, all negative, between Letter Names and Comprehension: main ideas (variable twenty-nine), and Comprehension: sequence-relationships (variable thirty-one), and Instructional Method: student-student (variable fifty-three).

When the T_1, T_2 and C_1 scores were aggregated, there were negative correlations between scores on the Letter Names variable and percentage scores in the cells of Cognitive-Perceptual: symbolic discrimination (variable twenty-two), Language Analysis: sight vocabulary (variable twenty-six), Comprehension: sequence-relationships (variable thirty-one), Sequential Level: grade two and below (variable forty-one), and Communication Output: oral motoric response (variable seventy-two). Positive significant correlations were found between letter names scores and cells of Sequential Level: ungradable (variable forty-five), and Instructional Method: student-total group (variable fifty-one).

The significant correlations of variable two (Letter Sounds) with the cells of the Taxonomy are displayed in Table 13.

In the T_1 group there were significant positive correlations between the learning of letter sounds and the scores of cells called Comprehension: sequence relationship (variable thirty-one), Aesthetic Expression: Interpretation (variable forty), Instructional Mode: play-competition (variable fifty-six), play puzzle (variable fifty-seven), and problem solving (variable sixty-one).

In the T_2 group there were no significant correlations.

TABLE 13

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 2 (LETTER SOUNDS) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
31	.6003			
40	.5022			
51			-.5613	
56	.4493			.4553
57	.4473			.3248
58				-.3427
61	.6908			

The scores of the C_1 group offered only one significant correlation. This was a negative correlation between variable two and the cell called Instructional Method: student--total group (variable fifty-one).

In the aggregate group scores, there were significant positive correlations between scores of variable two and cells labeled Instructional Mode: play-competition (variable fifty-six) and play-puzzle (variable fifty-seven). There was a negative correlation with variable two and Instructional Mode: test-response (variable fifty-eight).

Table 14 depicts the significant correlations between the scores of variable four (Short Sound Vowel Production) and the scores of the various cells of the Taxonomy of Instructional Treatments.

There were no significant correlations in either the T_1 or the C_1 group.

TABLE 14

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 4 (SHORT SOUND VOWEL PRODUCTION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
25				.3378
31				-.2912
32				.2878
33		.4859		
38		-.6433		.3679
46		.4596		
48				.2781
51		.4564		
57				.3178
58				-.3274
62				-.3008

In the T_2 group there were significant positive correlations between scores of improvement in variable four and scores for the variables of the Taxonomy named Comprehension: context inference (variable thirty-three), Sequential Levels: multi-level (variable forty-six), and Instructional Method: student--total group (variable fifty-one). There were negative correlations between the scores of variable four and scores for Study Skills: other sources and processes (variable thirty-eight), and Communication Output: motoric response (variable seventy-one).

In the scores of the groups aggregated, there were significant positive correlations between variable four and the variables of Language Analysis: vowels (variable twenty-five), Comprehension: word meaning (variable thirty-two), Instructional Method: teacher--

total group (variable forty-eight), and Instructional Mode: play-puzzle (variable fifty-seven). There was a negative correlation with the variables named Comprehension: sequence-relationship (variable thirty-one), Study Skills: other sources and processes (variable thirty-eight), Instructional Mode: test-response (variable fifty-eight), and Communication Input: visual (variable sixty-two).

Table 15 shows that in the T_1 group there were significant negative correlations only with variable five scores and scores in the variables named Language Analysis: sight vocabulary (variable twenty-six), and Instructional Method: teacher-student (variable fifty). In the C_1 group there was only one negative correlation, with the variable of Instructional Mode: programmed response (variable sixty). There were no significant correlations in either the T_2 scores or the scores in the T_1, T_2, C_1 group aggregate.

TABLE 15

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 5 (LONG SOUND VOWEL PRODUCTION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
26	-.4561			
50	-.6043			
60			-.5415	

Table 16 shows that the only significant correlations between scores of variable six (Short Sound Vowel Recognition) and scores of

the Taxonomic cells were found in the group aggregate scores. There were two significant negative correlations, between variable six and the cells of the Materials Index (variable twenty-one) and Instructional Method: student--total group (variable fifty-one), and one positive correlation, with Language Analysis: vowels (variable twenty-five).

TABLE 16

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 6 (SHORT SOUND VOWEL RECOGNITION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
21				-.3532
25				.3247
51				-.4223

Significant correlations between scores of variable seven (Long Sound Vowel Recognition) and scores of the Taxonomic cells are displayed in Table 17. There are seen no significant correlations within the scores of the T_2 group.

A significant negative correlation existed in the T_1 group between variable seven scores and the scores of the Materials Index (variable twenty-one). There were significant positive correlations between variable seven and scores in the cells labeled Cognitive-Perceptual: directionality-laterality (variable twenty-three), and Sequential Level: grade two through four (variable forty-two), and

Instructional Mode: test-response (variable fifty-eight).

TABLE 17

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 7 (LONG SOUND VOWEL RECOGNITION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
21	-.5301			
23	.5250			.2803
26			.7181	.4827
27				-.3214
29			-.7029	-.3505
31			.5153	.3816
41			.5998	.4256
42	.4857			
43				-.3630
48			-.5635	
55			.5374	
58	.4568			
59				-.2821
69			-.5578	-.2957
72			.6620	-.3420

In the C_1 group there were significant negative correlations between scores of variable seven and scores of Comprehension: main ideas (variable twenty-nine), Instructional Method: teacher-total group (variable forty-eight), and Communication Output: no response (variable sixty-nine). In this same group there were significant positive correlations with variable seven and the scores of Language Analysis: sight vocabulary (variable twenty-six), Comprehension: sequence relationships (variable thirty-one), Sequential Level: grade two and below (variable forty-one), Instructional Mode: play-

chance (variable fifty-five), and Communication Output: oral-motoric responses (variable seventy-two).

When scores were aggregated, there were significant negative correlations between scores of variable seven and scores of the cells of Language Analysis: word structure (variable twenty-seven), Comprehension: main ideas (variable twenty-nine), Sequential Level: grades four through five (variable forty-three), Instructional Mode: exploration (variable fifty-nine), Communication Output: no response (variable sixty-nine) and oral-motoric response (variable seventy-two). There were significant positive correlations with scores in variable seven and scores of Cognitive-Perceptual: directionality-laterality (variable twenty-three), Language Analysis: sight vocabulary (variable twenty-six), Comprehension: sequence-relationships (variable thirty-one), and Sequential Level: grade two and below (variable forty-one).

Significant correlations between scores of variable eight (Two-Letter Consonant Blends) and scores of the Taxonomic cells are arrayed in Table 18. There are seen no significant relationships between these variables in the scores of the T_1 group.

In the T_2 group, however, there were significant positive correlations between the scores of variable eight and scores in the cells named Language Analysis: syntax (variable twenty-eight), and Sequential Level: grade two and below (variable forty-one).

In the C_1 group there were significant positive correlations between the scores of variable eight and scores in the cells of the

Materials Use Index (variable twenty-one) and Instructional Mode: exploration (variable fifty-nine). There were significant negative correlations with Comprehension: details (variable thirty), and Instructional Mode: test-response (variable fifty-eight).

TABLE 18

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 8 (TWO-LETTER CONSONANT BLENDS) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
21			.5941	
25				.3061
28		.4560		
30			-.5164	
41		.5658		
58			-.6002	
59			.5216	

When scores are aggregated, there was only one correlation, a positive correlation between scores of variable eight and scores in the cell named Language Analysis: vowels (variable twenty-five).

In the array presented by Table 19, correlations between variable nine (Three-Letter Consonant Blends) and Taxonomic cell scores are displayed. There are shown no significant correlations between scores in the T_2 group and in the aggregate group analysis.

In the T_1 group, however, there was a significant positive correlation between the scores of variable nine and scores of the variable named Study Skills: dictionary (variable thirty-six).

TABLE 19

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 9 (THREE-LETTER CONSONANT BLENDS) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
25			-.5993	
36	.4778			
56			-.5006	

In the C_1 group there were two significant negative correlations, between the scores of variable nine and the scores of the cells named Language Analysis: vowels (variable twenty-five), and Instructional Mode: play-competition (variable fifty-six).

The significant correlations between the scores of variable ten (Rule of Final 'e') and the scores of variables twenty-one through seventy-two are displayed in Table 20. This table shows no significant correlations when the scores of the T_1 and C_1 group are analyzed alone.

TABLE 20

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 10 (RULE OF FINAL E) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
35		.5578		
46		.6820		.4381

The T_2 group, however, showed two significant positive correlations, between the scores of variable ten and the scores of the variables named Comprehension: recreational reading (variable thirty-five), and Sequential Level: multi-level (variable forty-six).

When scores were analyzed in the group aggregate, there was only one significant correlation, a positive correlation between scores of variable ten and scores in the Sequential Level: multi-level (variable forty-six) variable.

The significant correlations of the scores of variable twelve (Compound Words) with the scores of cells of the Taxonomy of Instructional Treatments is arrayed in Table 21. This table shows that there are no significant correlations when the scores of the T_2 group are analyzed separately.

TABLE 21

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 12 (COMPOUND WORDS) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
21	.5074		.5298	.4238
23	-.4824			-.3691
25	-.5509			-.3885
27	.4605			
28	-.4840			
29	.4528			
31	.5149			
42	-.6041			
43	.6067			
63	-.4926			

The table shows, however, that most of the significant correlations occurred in the scores of the T_1 group. In this group there were significant positive correlations between the scores of variable twelve and scores of the Materials Use Index (variable twenty-one) and cells named Language Analysis: word structure (variable twenty-seven), Comprehension: main ideas (variable twenty-nine) and sequence-relationships (variable thirty-one), and Sequential Level: grades four and five (variable forty-three). In this group there were also significant negative correlations between the scores of variable twelve and scores of the cells of Cognitive-Perceptual: directionality-laterality (variable twenty-three), Language Analysis: vowels (variable twenty-five) and syntax (variable twenty-eight), Sequential Level: grades two through four (variable forty-two), and Communication Input: auditory (variable sixty-three).

In the C_1 group there was only one correlation, a significant positive correlation between scores in variable twelve and scores of the Materials Use Index (variable twenty-one).

The same significant positive correlation, i.e., the correlation between scores in variable twelve and scores of the Materials Use Index (variable twenty-one) occurred when scores were aggregated. In this aggregate analysis there were also two negative significant correlations, between the scores of variable twelve and the scores of the cells named Cognitive-Perceptual: directionality-laterality (variable twenty-three), and Language Analysis: vowels (variable twenty-five).

Table 22, showing significant correlations between the scores of variable thirteen (Alphabet--Capital Letters) and scores in the cells of the Taxonomy of Instructional Treatment, shows few negative correlations.

TABLE 22

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 13 (ALPHABET--CAPITAL LETTERS) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
22	.7916			.4689
26	.4507			
27			.5293	
30			-.5181	
39			.7563	.3016
41	.5602	.4971		
42			.4975	
50	.6148			.3047
55	.6076			
56	.5615			
60		.4841		
63			.4981	
67	.8164			.5105
72	.6069			

In the T_1 group there were significant positive correlations between the scores of variable thirteen and the Taxonomic cells named Cognitive-Perceptual: symbolic discrimination (variable twenty-two), Language Analysis: sight vocabulary (variable twenty-six), Sequential Level: grade two and below (variable forty-one), Instructional Method: teacher-student (variable fifty), Instructional Mode: play-

chance (variable fifty-five) and play-competition (variable fifty-six), Communication Input: auditory-kinesthetic (variable sixty-seven), and Communication Output: oral motoric response (variable seventy-two).

In the T_2 group significant positive correlations existed between the scores of variable thirteen and the scores of the cells named Sequential Level: grade two and below (variable forty-one), and Instructional Mode: programmed response (variable sixty).

In the C_1 group there were significant positive correlations between the scores of variable thirteen and the scores of cells named Language Analysis: word structure (variable twenty-seven), Aesthetic Expression: creation (variable thirty-nine), Sequential Level: grades two through four (variable forty-two), and Communication Input: auditory (variable sixty-three). There was a significant negative correlation with the cell labeled Comprehension: details (variable thirty).

In the aggregated group score analysis, significant positive correlations existed only between scores of variable thirteen and scores of cells named Cognitive-Perceptual: symbolic discrimination (variable twenty-two), Aesthetic Expression: Creation (variable thirty-nine), Instructional Method: teacher-student (variable fifty), and Communication Input: auditory-kinesthetic (variable sixty-seven).

The significant correlations between the scores of variable fourteen (Alphabet--Lower Case Letters) and the variables of the Taxonomy of Instructional Treatments (twenty-one through seventy-two) are displayed in Table 23 by groups.

TABLE 23

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 14 (ALPHABET--LOWER CASE LETTERS) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
24	.4964			
25		-.5184		
27	-.4565		.5319	
31		.5575		
38		.5225		
39			.7814	.3460
40	-.4990			-.3497
41	.5427			
42		-.4594	.5094	
52		.7167		
55	.6032			.2886
57	-.5162			-.3292
60	.5600			
67	.8100			.4769
72				.3082

The T_1 group displayed positive correlations between the scores of variable fourteen and the scores of cells named Language Analysis: consonants (variable twenty-four), Sequential Level: grade two and below (variable forty-one), Instructional Mode: play-chance (variable fifty-five) and programmed response (variable sixty), and Communication Input: auditory-kinesthetic (variable sixty-seven). There were significant negative correlations with the cells of Language Analysis: word structure (variable twenty-seven), Aesthetic Expression: interpretation (variable forty), and Instructional Mode: play-puzzle (variable fifty-seven).

In the T_2 group there were significant positive correlations

between scores of variable fourteen and scores of Taxonomic cells named Comprehension: sequence-relationships (variable thirty-one), Study Skills: other sources and processes (variable thirty-eight), and Instructional Method: student--small group (variable fifty-two). There were significant negative correlations with Language Analysis: vowels (variable twenty-five), and Sequential Level: grades two through four (variable forty-two).

In the C_1 group there were only significant positive correlations, between the scores of variable fourteen and scores of the cells named Language Analysis: word structure (variable twenty-seven), Aesthetic Expression: creation (variable thirty-nine), and Sequential Level: grades two through four (variable forty-two).

In the group aggregated score analysis, significant positive correlations were found between the scores of variable fourteen and the scores of Taxonomic cells named Aesthetic Expression: creation (variable thirty-nine), Instructional Mode: play-chance (variable fifty-five) and programmed response, and Communication Input: auditory kinesthetic (variable sixty-seven) and Communication Output: oral motoric (variable seventy-two). There were significant negative correlations with Aesthetic Expression: interpretation (variable forty), and Instructional Mode: play-puzzle (variable fifty-seven).

Table 24 displays the significant correlations between the scores of variable fifteen (Initial Consonant Recognition) and the scores related to the Taxonomy of Instructional Treatments. It shows that only an analysis of scores by treatment groups produced significant

correlations. When scores were aggregated, no significant correlations were found.

TABLE 24

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 15 (INITIAL CONSONANT RECOGNITION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variables	T_1	T_2	C_1	T_1, T_2, C_1
26			.5184	
29			-.6110	
37		.5220		
60		.8379		
69	-.4798			

In the T_1 group, there was only one significant correlation, a negative correlation between the scores of variable fifteen and the scores for the Taxonomic cells called Communication Output: no response (variable sixty-nine).

In the T_2 group, there were two significant correlations, both positive. They were between the scores of variable fifteen and the scores for the Taxonomic cells labeled Study Skills: speed and accuracy (variable thirty-seven), and Instructional Mode: programmed response (variable sixty).

In the C_1 group a positive significant correlation was found between the scores of variable fifteen and the scores of the cell named Language Analysis: sight vocabulary (variable twenty-six) and a negative significant correlation between the scores of variable

fifteen and the cell labeled Comprehension: main ideas (variable twenty-nine).

Variable sixteen (Final Consonant Recognition), as shown in Table 25, displays few significant correlations between its scores and the scores of the Taxonomic cells. Indeed, there were no significant correlations to be found in the analysis of scores of the T_2 group or all scores in aggregate.

TABLE 25

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 16 (FINAL CONSONANT RECOGNITION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
40			-.7712	
59			-.5221	
68	-.4727			

The T_1 group score analysis showed only one significant correlation, a negative one between the scores of variable sixteen and the scores of a Taxonomic cell named Communication Input: visual-auditory-kinesthetic (variable sixty-eight).

The C_1 group score analysis showed two negative correlations, between the scores of variable sixteen and the scores in the cells called Aesthetic Expression: interpretation (variable forty), and Instructional Mode: exploration (variable fifty-nine).

Unlike scores in all other variables from one through ten, the

raw data of variable seventeen (Wepman Auditory Discrimination Test) were composed of scores of errors of subjects. Thus a significant negative correlation in Table 26 would serve to indicate that a higher score in the Taxonomic cells would usually mean a lower error score (or growth of auditory discrimination skills). All the significant correlations but one are in this direction.

TABLE 26

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 17 (WEPMAN AUDITORY DISCRIMINATION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
31			-.5043	-.3037
38		-.6668		-.4128
48				.2915
52		-.5108		
71	-.4593			-.2958

In the T_1 group, there was a significant negative correlation between the scores of variable seventeen and scores of the Taxonomic cell called Communication Output: motoric response (variable seventy-one).

In the T_2 group, there were two significant negative correlations, between the scores of variable seventeen and the two Taxonomic cells of Study Skills: other sources and processes (variable thirty-eight), and Instructional Mode: student-small group (variable fifty-two).

In the C_1 group, there was only one correlation, a significant

and negative correlation between the scores of variable seventeen and the cell named Comprehension: sequence-relationships (variable thirty-one).

In the aggregate group score analysis, there was a significant positive correlation between the scores of variable seventeen and the scores of the cell Instructional Method: teacher-total group (variable forty-eight). There were significant negative correlations between the scores of variable seventeen and the scores of cells named Comprehension: sequence-relationships (variable thirty-one), Study Skills: other sources and processes (variable thirty-eight), and Communication Output: motoric response (variable seventy-one).

Table 27 represents the analysis of data for correlations between variable eighteen (Gates-MacGinitie, Vocabulary) and the variables of the Taxonomy of Instructional Treatments. It shows that there were no significant correlations when the data were analyzed for the T_1 group alone.

In the T_2 group, however, there were significant positive correlations between the scores of variable eighteen and the scores of the cells called Comprehension: word meaning (variable thirty-two), and Instructional Mode: play-chance (variable fifty-seven) and play-puzzle (variable fifty-seven). There are significant negative correlations with the cells called Comprehension: critical analysis (variable thirty-four), and Instructional Method: teacher-student (variable fifty).

In the C_1 group, there were significant positive correlations

between the scores of variable eighteen and the scores of Taxonomic cells labeled Comprehension: context inference (variable thirty-three), and Communication Output: no response (variable sixty-nine). There were significant negative correlations between the scores of variable eighteen and the scores of the cells labeled Aesthetic Expression: creation (variable thirty-nine), and Communication Output: oral-motoric response (variable seventy-two).

TABLE 27

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 18 (GATES-MACGINITIE--VOCABULARY) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
32		.6267		
33			.4978	
34		-.4604		-.3472
37				-.3032
39			-.5373	
50		-.4674		
55		.7496		
57		.6795		.3733
69			.5790	
72			-.5277	

In the aggregate group score analysis, a significant positive correlation was noted between the scores of variable eighteen and the scores of the cell called Instructional Mode: play puzzle (variable fifty-seven). There were significant negative correlations with the cells of Comprehension: critical analysis (variable thirty-four), and Study Skills: speed and accuracy (variable thirty-seven).

Significant correlations between the scores of variable nineteen (Gates-MacGinitie--Comprehension) and scores of the cells of the Taxonomy of Instructional Treatments are arrayed in Table 28. This table shows that there are no significant relationships to be found in these data when analyzed for the T_1 group alone.

TABLE 28

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 19 (GATES-MACGINITIE--COMPREHENSION) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
34		-.5865		-.3676
39		-.4604		-.3127
62		-.6493		
65		.6259		
66				-.3208
69			.6793	

The T_2 group, however, had significant correlations. There was a significant positive correlation between the scores of variable nineteen and the scores of the cell called Communication Input: auditory-visual (variable sixty-five). There were negative correlations with the cells of Comprehension: critical analysis (variable thirty-four), Aesthetic Expression: creation (variable thirty-nine), and Communication Input: visual (variable sixty-two).

In the C_1 score analysis, there was found a positive and significant correlation between the scores of variable nineteen and the scores of the cell called Communication Output: no response (variable

sixty-nine).

In the group aggregate score analysis, there were found three significant and negative correlations. They are with the scores of variable nineteen and the scores of the cells labeled Comprehension: critical analysis (variable thirty-six), Aesthetic Expression: creation (variable thirty-nine), and Communication Input: visual-kinesthetic (variable sixty-six).

Table 29 links the intelligence variable (variable twenty) to an analysis of scores of the Taxonomic variables.

TABLE 29

PEARSON r BETWEEN DIFFERENCE SCORES OF VARIABLE 20 (PEABODY PICTURE VOCABULARY TEST--IQ) AND CELLS OF OBSERVATIONAL ANALYSIS (VARIABLES 21-72)

Variable	T_1	T_2	C_1	T_1, T_2, C_1
26	-.4628			
28				.3154
32			-.5150	
35	-.4902			
37				-.2956
51				-.2870
59		-.4593		
70	.4635			

In the T_1 group, a significant positive correlation existed between the scores of variable twenty and scores of the cells labeled Communication Output: oral response (variable seventy). There were significant negative correlations with the cells called Language

Analysis: sight vocabulary (variable twenty-six), and Comprehension: recreational reading (variable thirty-five).

In the T_2 group, there was only one significant correlation, a negative correlation with Instructional Mode: exploration (variable fifty-nine).

In the C_1 group, there was also only one significant correlation, a negative correlation with Comprehension: word meaning (variable thirty-two).

In the group aggregate score analysis, there existed a significant positive correlation between the scores of variable twenty and the scores of the cell called Language Analysis: syntax (variable twenty-eight). There were significant negative correlations with Study Skills: speed and accuracy (variable thirty-seven), and Instructional Method: student-total group (variable fifty-one).

CHAPTER VI

DISCUSSION AND SUMMARY

Quantitative: The Hypothesis

The primary hypothesis of this experiment, i.e., reading scores on post-treatment tests would be significantly greater for those students whose teachers had received help using the Taxonomy of Instructional Treatments than for those students whose teachers had not received such help, when pre-treatment and I.Q. scores were held constant was not supported.

Four data analyses were used to test the primary hypothesis. The post-treatment raw scores of two standardized reading tests, the Gates-MacGinitie Vocabulary Test and the Gates-MacGinitie Reading Comprehension Test, were submitted to an analysis of covariance, first holding constant the pre-treatment raw scores and then holding constant the I.Q. scores of the PPVT. Three of these statistical tests showed no significance. The analysis of covariance of the post-treatment raw scores of the Gates-MacGinitie Comprehension Test, holding constant the PPVT I.Q. scores, however, showed a significant F ratio.

This finding of significance was not sufficient to justify the rejection of the null hypothesis. Previous tests of the effect of I.Q. scores on all tests of reading gain had shown only a negligible relationship. Therefore, the more important test was that analysis of

covariance which held the pre-treatment scores constant. The resulting analysis did not support the findings of significance.

The secondary hypothesis, i.e., $T_1 > T_2 > C_1$ or C_2, was not tested on the Gates-MacGinitie Reading Tests because of the rejection of the primary hypothesis, but was used to explore differences found in post-treatment scores of the staff-made tests.

For purposes of exploration, data from sixteen staff-made non-standardized tests of reading elements were analyzed. For these explorations, analyses of covariance were computed on the post-treatment raw scores holding constant (1) the pre-treatment raw scores; (2) the post-treatment raw scores of the Gates-MacGinitie Vocabulary Test; (3) the post-treatment raw scores of the Gates-MacGinitie Comprehension Test; and (4) the PPVT I.Q. scores. Significance was accepted only if it was obtained under all four control conditions.

Variables two (Letter Sounds), four (Short Sound Vowel Production), six (Short Sound Vowel Recognition) and eight (Two-Letter Consonant Blends) gave significant F ratios under all four control conditions. In Scheffé Tests for the contrasts of means, it was found that in variable two, T_1 and T_2 were significantly greater than C_1 but not C_2. In variables four and eight, T_1 and T_2 were significantly greater than either C_1 or C_2, but T_1 was not significantly greater than T_2. Only the results of analysis of variable six showed substantiation of the secondary hypothesis, $T_1 > T_2 > C_1$ or C_2.

It is possible to infer from these results that the treatment had a significant effect upon some of the basic elements of reading,

i.e., Letter Sounds, Short Sound Vowel Production and Recognition, and Two-Letter Consonant Blends. Differentiating the treatment into two groups (T_1 and T_2) did not produce differentiated statistical significance between these groups. Insofar as the staff-made tests are valid indicators of reading element gain, they demonstrated four (out of sixteen) possible gains in reading skill attainment which were related to the introduction of the Taxonomy of Instructional Treatments. The gains were general and few, insufficient to suggest that rejection of the major hypothesis was spurious.

The rejection of the major hypothesis raises the question of the possibility of a Type I error (i.e., the rejection of a hypothesis when it is true). The limitations of this experiment were defined by those conditions which could increase the probability of a Type I error. These limitations were as follows:

1. Sample groups contained small n's and differing reading ability levels. Table 1 shows that the T_2 reading group, for instance, was 2.1 grades higher in its mean than the C_1 group in the Gates-MacGinitie Vocabulary Test scores. The mean of T_2 is also 1.6 grades higher than the C_1 mean in the Gates-MacGinitie Comprehension Test and 10.0 I.Q. points higher than C_1 in scores of the PPVT. These sample characteristics were due to the fact that there were only limited numbers of groups available to the experiment. The predicted size of the groups was never obtained because of the traumatic nature of the school year as explained below.

2. The 1968-69 school year was interrupted by an eleven-week

teachers' strike which reduced the morale and instructional efficiency in the experimental schools for the entire year. Because the strike occurred from September to November it interrupted the pre-testing phase and prolonged it to fourteen weeks. The truancy rate increased substantially (decreasing the number of eligible students for inclusion in the data base). To regain time lost in the strike, students were asked to extend the school day by an additional period, time often spent in recreational or remedial reading. The increased hours of school often created a state of physical fatigue in students, conducive only to decreased efficiency. This fatigue was also due to the fact that the students often had to travel as long as two hours to the school.

3. Because of the teachers' strike, the treatment period was necessarily shortened. Whereas the treatment period had originally been planned for six and one-half months, it was limited to four and one-half months. Since four months are generally needed to show results on a standardized reading test, this treatment period length probably contributed to the depression of significant gain scores.

4. Because the Taxonomic resource staff members were new to each other in the school year of the experiment, and because the resource staff was new to the school and faculty, role definitions had to be reaffirmed. Role definition and role consistency were hampered by the temporary absence of the original Project Director for that year and the substitution of an Associate Project Director. For a time, resource staff members were either unaware or uncertain as to

what and how information could be transmitted to teachers. As a result, an emphasis on diagnostic teaching was lacking and acquisition of materials was slow. Roles were generally well defined, however, by the first of the treatment periods, and treatment was generally effected without the process of diagnostic teaching.

Exploratory Statistics

A correlational matrix was computed between scores in each group (and the groups aggregated) on reading scores and the percentages of time each subject spent in each cell of the Taxonomy (as measured by the Classroom Observation Analysis Sheet). This matrix was meant to be exploratory only in that it meant to probe the relationships between reading activity (as described by the Taxonomy of Instructional Treatments) and reading score gain. The findings of this matrix were also meant to form the basis for inferences related to overall concepts of instruction in the education of emotionally disturbed children.

There are limitations to the drawing of inferences from this matrix. These limitations were derived mostly from the nature of the data themselves and the characteristics of the population from which they were taken. Specifically, the limitations of the correlation matrix which included reading score gains and percentage of involvement in taxonomic cells were as follows:

1. The correlations were based on gain scores from both standardized test scores (the Gates-MacGinitie tests, the Wepman

Auditory Discrimination Test, and the PPVT) and non-standardized test scores (staff-made tests and the Materials Use Index). The comparability of such data is unknown.

2. The gain scores of the standardized tests were based on scores obtained from equivalent form tests. Scores on the staff-made tests were obtained on a test-retest basis. Although inspection of the data from the staff-made tests seems to indicate that pre- and post-treatment scores were independent, the error variance due to the teaching effect is not known.

3. Some of the cells of the Taxonomy contained little or no participation percentages for some individuals. Although the computation program took into account zero cells, the exact number of subjects whose data were being analyzed for each taxonomic category was unknown.

4. Group n's were small and means of groups varied. These facts raised the question once again of the comparability of data across groups.

5. For each of the first twenty-one variables, two hundred correlations were searched for significance. These two hundred correlations derived from fifty taxonomic categories correlated with four groups of scores per category (T_1, T_2, C_1 and all groups aggregated). Setting a conservative significance $p < .05$, the data should have shown that at least ten scores per variable (variables one through twenty-one) could be due to the operation of chance factors. Except for variables seventeen through twenty-one (which were deemed

of special significance) analysis of any variable between one and sixteen with the matrix of the Taxonomy were not reported unless there were ten or more correlations in that variable.

Scores on the Gates-MacGinitie Vocabulary Test were analyzed to determine which factors of observed reading behavior correlated with this standardized test score gain. Table 26 of the previous chapter displays the r coefficients. There were no significant correlations between the Gates-MacGinitie Vocabulary Test Scores and the scores of the Taxonomy in the T_1 group. This finding obviously contributes to the finding of no significance in the test of the major hypothesis. Findings in the T_2, C_1 and Aggregate group indicated that the variable of vocabulary had positive correlations to time spent in play-strategy reading activities and in the analysis of words. This finding seems to indicate that a strategy of play, either play-puzzle or play-chance, was more effective in raising vocabulary scores than was extensive use of materials, the condition in T_1. Indeed, the factors of critical analysis and aesthetic creation were negatively correlated with vocabulary score gains. This finding seems to indicate that the students seemed to learn vocabulary better by play in group activities than by instructional materials involving more cognitive processes.

The Gates-MacGinitie Comprehension Test scores showed many of the same correlations as the Gates-MacGinitie Vocabulary Test scores (Table 28). As in the Gates-MacGinitie Vocabulary Test, there were no significant correlations in the T_1 group. Also similar to the Gates-MacGinitie Vocabulary Test score correlations were the negative

correlations between comprehension scores and time spent in critical analysis and aesthetic creation activities. The correlations of this variable suggest that the presentation of materials through selected sensory modalities is related to achievement in comprehension. A positive correlation in T_2 was found with time spent in the auditory-visual mode, but in T_2 there also was found a negative correlation with the visual mode alone. In the aggregated group score there was a negative correlation with the visual-kinesthetic mode. This finding seems to suggest that material presentation, to be effective in the learning of reading comprehension, must be placed in the auditory-visual mode alone and need not require an active communication output. In both the vocabulary and the comprehension tests, the categorizations of critical analysis and creation were found to be negatively correlated. This is perhaps explained by the fact that the label "critical analysis" refers to evaluation of information, ideas and opinions contained in reading materials or discussions based on personal values, previous experiences and knowledge, while "creation" refers to the act of bringing into existence that which has not existed before, based on the experiential background of the child (see Appendix C--Glossary). Both of these activities rely on standardized experiential and knowledge backgrounds, attributes already known to be deficient in the boys of the sample. Thus, activities in this area probably served only to confuse or make difficult the learning of the language concepts of vocabulary acquisition and comprehension skill building.

The measurement of the number of materials used per pupil per class, the Materials Use Index was computed in order to seek out any relationships between this variable and reading skill acquisition as measured by variables one through nineteen. The correlations, however, showed that only one variable was related to this measurement. Variable twelve, Compound Words, showed a significant positive correlation in the T_1, C_1 and Aggregated Group scores. Variable six, Short Sound Vowel Recognition, showed a negative correlation in the Aggregated Group scores and variable seven, Long Sound Vowel Recognition, showed a negative correlation in the T_1 group scores. Variable eight, Two-Letter Consonant Blends, showed a positive correlation in the C_1 group scores. Such findings allow the speculation that the more materials used by a teacher the more effective will be his teaching of the skills of analyzing and reading compound words. Beyond this generalization, the data either reflected no discernible correlation among variables or the measuring instruments were not sensitive enough to reveal them.

The PPVT I.Q. scores were correlated with percentages of time spent in the taxonomic cells in order to determine the possible impact on this variable as a function of taxonomic behavior (Table 29). The results were diverse. Most important to the findings were the negative correlations with sight vocabulary (in the T_1 group), and word meaning (in the C_1 group). Since these variables actually defined the skills requested in answering the questions of the PPVT, the findings of negative significance are incomprehensible and probably

due to chance factors.

Correlations were computed between the scores of the Wepman Auditory Discrimination Test and the percentages of time in the Taxonomy in an attempt to determine the relationships of these categories to the improvement of auditory discrimination skills (Table 26). Only two variables, sequence-relationships and study skills--other, showed correlations with more than one group. These correlations were both negative; the sequence-relationships variable was significant in the C_1 and Aggregated Group conditions and the Study Skills--Other variable was significant in the T_2 and Aggregated Group conditions. These findings appear to be uninterpretable.

Variable one, Letter Names, was one of the variables containing over ten correlations and thus suggesting the presence of a greater-than-chance relationship with factors of Taxonomy involvement. This variable showed no correlations in T_2 scores and all negative correlations in T_1 and C_1 scores. Inferences of the correlations suggest that a multi-grade approach to teaching is more effective than instruction at grade two and below. Negative correlations were found with unusual styles and modes of teaching, such as the visual-auditory-kinesthetic instruction and student-student grouping. These findings suggest that letter name skill acquisition is probably facilitated by heterogeneity of grade levels but homogeneity of teaching strategies.

Variable two, Letter Sounds, had correlations similar to variable one, Letter Names (Table 13). The T_2 group was not represented by significant correlations. Again T_1 had the most positive correlations.

These correlations indicate that the use of higher level thought activities such as sequence-relationship, aesthetic interpretation and problem solving have a positive effect on the learning of the skills of letter sounds when accompanied by sufficient materials (the condition of the T_1 group). The findings of significant correlations between the variables of play-competition and play-puzzle in the Aggregated Group scores can be interpreted as a speculation that learning of letters can also occur through the utilization of games. Intuitive use of materials (the condition of the T_2 group) was not sufficient to effect the learning of either letter names or letter sounds in this experiment.

Variable four, Short Sound Vowel Production, was correlated only with scores from the T_2 group and the Aggregated Group (Table 14). The positive correlations found in this variable were generally those of a high order of reading complexity, e.g., context inference, multi-level materials, student--total grouping, play-puzzle strategies, etc. These findings indicated that for a high level reading group, T_2, high order reading activities were required for reading score improvements. The more traditional mode, visual input, and the more traditional teaching strategy, test-response, were shown to be negatively correlated with acquisition of the skills of short sound vowel production.

Variable seven, Long Sound Vowel Recognition, is displayed in Table 17. There were no scores for T_2, probably because the population of T_2 was already familiar with the skill of Long Sound Vowel

Recognition and had achieved high scores on this variable. The patterns of the correlations for this variable suggest that the group which received help with materials, T_1, best utilized basic skill material at grades two through four to achieve the teaching of long sound vowel recognition. For the group not receiving materials help, C_1, a wider repertoire of content, strategies and response mechanisms at grade two and below were needed to effect the learning of the long sounds of vowels.

Correlations between participation in cells of the Taxonomy and variable twelve, Compound Words, resides mostly in the T_1 group scores of this variable (Table 21). No correlations in T_2 are perhaps explained by the functioning of that group at a reading level which measured this skill at the top of the scale. The group using materials extensively, T_1, showed a relationship between both the number and level of materials presented to students and their improvement in knowledge about compound words. Grades four and five materials seemed optimum to learning of this skill in T_1, but grade level was not significant as a predictor of success in the other groups.

There were nineteen correlations between the percentages of participation in taxonomic activities and variable thirteen, Alphabet--Capital Letters (Table 22). The positive correlations between the skills of this variable and symbolic discrimination might be expected, since symbolic discrimination was needed to complete this task. In all groups the grade level of material was important. Grades two through four seemed to be most indicative of success although the

activity measured is considered a primary level activity. Almost all variables required auditory input for success, and two variables suggested a relationship between skill acquisition and kinesthetic mode input. In the groups using materials help, T_1 and T_2, the materials were pitched at basic and foundational levels. In the groups not using material help, higher order reading activities showed correlations with skill acquisition.

The correlations between variable fourteen, Alphabet--Lower Case Letters, and the cells of the Taxonomy (Table 23) are similar to the correlations of variable thirteen, Alphabet--Capital Letters. All groups showed the use of an effective materials grade level of two through four. There were also correlations between effective learning and input in both auditory and kinesthetic modes. The correlations also showed, as with variable thirteen, that T_1 and T_2 taught their children with more basic level materials than did C_1, who elected to teach at more abstract reading levels.

For purposes of further exploration, those cells of the Taxonomy which were used frequently by subjects were correlated with the scores of reading tests. The purpose of this analysis was to determine if there were possible main effects that could be observed. Specifically, variables twenty-two, twenty-nine, thirty-six, forty-one, forty-eight, fifty-eight, sixty-five and seventy were thus perused:

1. Variable twenty-two (Cognitive-Perceptual: symbolic discrimination) was correlated positively with the T_1 and Aggregate Group scores of Long Sound Vowel Recognition. Variable twenty-two

was negatively correlated with the T_1 and Aggregated Group scores of Compound Word skills.

2. Variable twenty-nine (Comprehension: main ideas) was correlated positively with the T_1 scores of Compound Word skills. It was negatively correlated with the C_1 scores of Letter Names and Initial Consonant Recognition. It was negatively correlated with both C_1 and Aggregated Group scores of the variable Long Sound Vowel Recognition. These correlations indicate that the skill acquisition was hampered by participation in activities based at lower grade or foundational content level.

3. Variable thirty-six represents the categorization of Study Skills: dictionary. Since this variable produced only one correlation, with the T_1 group scores from the variable Three-Letter Consonant Blends, it can be interpreted in terms of the operation of chance factors.

4. Variable thirty-nine represents Aesthetic Expression: creation. It was positively correlated with C_1 and Aggregated Group scores of the variables Alphabet: capitals, and Alphabet: lower case. Perhaps these scores infer that when a teacher has little access to the use of extensive materials, he can accomplish his teaching mission by asking students to create.

5. Variable forty-one is Sequential Level: grade two and below. There are positive correlations with C_1 and Aggregated Group Scores of the variable Long Sound Vowel Recognition, of T_2 scores of the variable Two-Letter Consonant Blends, with T_1 and T_2 scores of the

variable Alphabet--capitals, and with T_1 of the variable Alphabet--lower case, all activities which are normally offered at grade two and below. There was a negative correlation with T_1 and Aggregated Group scores on the variable Letter Names, a relationship that appeared unexplainable except as chance.

6. Variable forty-eight was named Instructional Method: teacher--total group. This variable showed a negative correlation to the scores of C_1 in the variable Long Sound Vowel Recognition. There were two positive correlations, with the Aggregated Group scores of Short Sound Vowel Production and the Wepman Auditory Discrimination Test variable. It is speculated that the teacher--total group teaching strategy requires sufficient listening and talking to strengthen auditory discrimination skills. These skills were necessary not only for recording gains in performance on the Wepman Auditory Discrimination Test, but also on tests of vowel recognition.

7. Variable fifty-eight describes the most frequently used mode of presentation, the test-response mode. It was correlated positively with T_1 of the variable Long Sound Vowel Recognition. It was correlated negatively with the Aggregated Group scores of the variables Letter Sounds and Short Sound Vowel Production. It was also negatively correlated with the variable Two-Letter Consonant Blends. These findings suggest that the test-response mode was not conducive to obtaining the necessary auditory feedback to self-correct vowel and consonant sounds in isolation.

8. Variable sixty-five is named Communication Input: auditory-visual. It was positively correlated only with T_2 scores of the Gates-MacGinitie Comprehension Test. With only one correlation it would be futile to infer relationships.

9. Communication output: oral response is the content of variable seventy. It was correlated positively only with T_1 scores of the PPVT. A relationship cannot be inferred.

From these analyses of the most frequently used Taxonomic activities, it is impossible to postulate consistent effects that could help to explain the findings.

Qualitative: The Schema

The remainder of the discussion attempts to derive a synthesis of the findings. This part of the discussion attempts to combine the most frequent informal observations with the most frequent findings in order to postulate trends which may in turn be useful in formulating further research and evaluation of the Taxonomy of Instructional Treatments. The conclusions are derived from observations by all staff members and are derived by the methodology described by Selltiz, et al.[1] The methodology seems justified by the argument that multiple observations must be used to describe learning

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[1]Claire Selltiz, et al., Research Methods in Social Relations (New York: Rinehart and Winston, 1962), pp. 207-221.

macro-events and are useful if reliably reported.[1]

The constructs and concepts of the qualitative discussion appear in schematic form in Figure 1. In this figure, each construct is introduced by motivating needs in the student and concluded by the translation of the construct to educational practice. A feedback component would make the construct cyclical.

Observed characteristics of the emotionally disturbed, socially maladjusted boys of this population are described in the first column labeled "Characteristics of Emotionally Disturbed Boys." These characteristics are synthesized from conversations with the Taxonomic staff, their notes and logs, and from interpretations by school administrators and mental health personnel.

Column 2 summarizes "baseline" activities of reading which seem to relate to the characteristic described. The designation "baseline" denotes that they were observed in the Control groups and appeared to represent the usual practices of these teachers.

Column 3, "Trends in Treatment Groups," attempts to relate practices in the Treatment groups which are related to the reinforcement, extinguishing or modification of the characteristic described in column 1. These practices either purposefully replicate baseline activities or differ from them significantly as a method for achieving desired reading objectives.

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[1]Marie Jahoda, Current Concepts of Positive Mental Health (New York: Basic Books, 1958), p. 81.

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
1. hyperactivity	1.a. in-seat tasks as usual b. much teacher effort to suppress motoric activity c. little attempt at kinesthetic learning in reading	1.a. utilization of kinesthetic channels for learning b. motorically oriented reading games c. frequent shifts in classroom activity pattern

Implications 4	Recommendations 5
1.a. motoric/kinesthetic activities are intrinsic needs of this population b. kinesthetic channel can be used as compensatory or supplementary to visual or auditory channels c. unchanneled hyperactivity decreases reading skill acquisition	1.a. development of techniques of gross motor and kinesthetic strategies of curriculum presentation b. use of "shift strategies" throughout reading period c. development of "kinesthetic curriculum"

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
2. loneliness	2.a. grouping usually teacher-small group or individual study b. class social structure often well defined by reading skills	2.a. more student-student grouping

Figure 1

Qualitative Observations on Problems Encountered and Attacked by Taxonomic Staff and Treatment Group Teachers

Implications 4	Recommendations 5
2.a. loneliness inhibits reading skill acquisition b. loneliness for this population must be overcome by peers c. student-student grouping or play strategies increase chances of overcoming loneliness	2.a. greater use of student-student groupings with this population b. develop reading play strategies with high positive reinforcement value

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
3. poor reader	3.a. use of nationally standardized and graded texts and workbooks b. Taxonomic cells most used: 1) cognitive-perceptual: symbolic discrimination 2) cognitive-perceptual: memory span 3) language: consonants 4) language: vowels 5) language: sight vocabulary 6) comprehension: main ideas 7) comprehension: details	3.a. informal, individually prescribed curriculum materials b. additional Taxonomic cells frequently used 1) language: word structure 2) recreational reading 3) context inference 4) perception, aesthetic 5) student-small group 6) student-student group 7) play-chance mode 8) play-competition 9) play-puzzle mode 10) input: multi-sensory 11) output: motoric

Figure 1 (continued)

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
3. poor reader	3.b.8) study skills: skimming 9) teacher-small group 10) individual group 11) test-response mode 12) input: visual 13) input: auditory 14) output: oral c. reading measured by nationally standardized tests	3.c. informal tests based on daily curriculum

Implications 4	Recommendations 5
3.a. heterogeneity of curriculum offerings needed to diagnose this population and remediate individual needs b. nationally standardized texts and workbooks not appropriate or adequate to this population c. tests must be based in present and upon current curriculum to be most helpful	3. Taxonomic teaching as used to individualize, personalize and diagnose

Figure 1 (continued)

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
4. different experiential background	4.a. standardized texts and workbooks based on white, middle-class standards b. low materials use index	4.a. more divergent and relevant individual curriculum materials b. lessons themed on juvenile interests c. many significant correlations between reading skill acquisition and use of heterogeneous curriculum materials

Implications 4	Recommendations 5
4.a. lacking curriculum based on local norms, divergency of curriculum adapts better to individual needs b. relevance of content is learned more easily than non-relevant content	4.a. individualization and personalization of curriculum b. review of current material for relevancy

Figure 1 (continued)

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
5. low self esteem	5.a. use of classroom grouping which clearly delineated "good" from "bad" readers b. use of ridicule and jest to control c. individual remediation in front of peers d. low status curriculum-- "baby stuff"	5.a. mixing of groups and experimental "buddy system" b. more student-student groups to establish peer values c. high interest-low vocabulary reading materials created or found

Implications 4	Recommendations 5
5.a. peer groups can raise self esteem b. effective curriculum materials have a facade appropriate to age of user group	5.a. use variety of grouping practices b. avoid judgment of value-related activities

Figure 1 (continued)

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
6. short attention span	6.a. reading sessions long--about 30 minutes with only 1 or 2 major activities b. low interest curriculum material	6.a. greater variety of activities during reading session b. high interest curriculum materials or topics

Implications 4	Recommendations 5
6.a. frequent shift of activities captures short attention span (effective only when all activities have coordinated objectives) b. only relevant material is intrinsically motivating enough to force longer attention span	6.a. many activities with same instructional goals within reading period b. interesting (motivating) curriculum content

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
7. thought disorders	7.a. teaching on basis of little clinical information b. little attention to cognitive or affective styles of learning	7.a. use of standardized reading tests and staff-made reading diagnostics b. discussion of individual learning with taxonomy staff

Figure 1 (continued)

Implications 4	Recommendations 5
7.a. need diagnostic information on student which relates to instructional materials	7.a. diagnostic teaching using taxonomic categories as parameters (see Appendix A) b. documentation of each student's learning style

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
8. familiar with non-structured environments	8.a. teacher-small group grouping and test-response mode b. single textbook/workbook basis for all individual work c. little use of divergency methods and modes of teaching same goals	8.a. grouping same but more diversity of work and delineation of goals b. few attempts at aesthetic content or play-chance mode

Implications 4	Recommendations 5
8.a. structure has to be clearly delineated and enforced to be meaningful to this population b. preparation for carryover of learning necessitates teaching of learning sets in the midst of diversity	8.a. clear delineation of classroom structure b. use of chance strategies and aesthetic content to teach learning through non-structured environments

Figure 1 (continued)

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
9. differing modes of perceptual and motor learning effective	9.a. primary use of visual input, oral output b. no perceptual or motor foundational activities	9.a. heterogeneity of sensory input and motor output

Implications 4	Recommendations 5
9.a. visual input and oral output less effective than other modes for learning certain reading skills, e.g.: 1) auditory input correlated with significant improvement in Gates-MacGinitie Comprehension, Wepman, Vowels, Letters 2) visual input negatively correlated with vowels	9.a. conversion of materials (via taxonomy) to differing sensory and motor modes b. develop or adapt developmental tests of perceptual and motor skills

Figure 1 (continued)

Characteristics of Emotionally Disturbed Boys 1	Baseline Activities of Reading in Control Groups 2	Trends in Treatment Groups 3
10. motivated for help from "600" schools	10.a. "Traditional" school image (but with smaller classes) b. use of identical curriculum material and expectations as in previous school c. educational objectives for each student fuzzy	10.a. variety of differing curricula and methods b. step by step objectives

Implications 4	Recommendations 5
10.a. school will be made more motivating if it obviously attempts individualization and personalization (significant correlations between heterogeneity of contents and strategies and learned material)	10.a. functional curriculum with clear goals and objectives

Figure 1 (continued)

When the activities of column 3 differ from column 2, it may be assumed that the teachers in the Treatment group with the help of the Taxonomic Teaching staff had postulated necessary changes in their teaching behavior to accomplish reading objectives. A continuation of baseline activities meant that either the Treatment group teachers felt the activity to be congruent to appropriate reading strategies or they were unable to effect a teaching method change. Column 4 (Implications) clarifies what the differences or congruencies between the activities of the Control and Treatment group might mean.

Column 5 lists attempts to recommend teaching strategies and practices for boys displaying characteristics similar to those described in column 1. Column 5 attempts to synthesize the successes of column 3 and the implications of column 4 to form recommendations. As such, column 5 lists suggested activities that are not yet tested and thus could form the bases for research hypotheses or evaluation objectives.

This discussion attempts therefore to document the changes in reading instruction in Public School 9. The changes were directly related to the intervention of a professional resource staff dedicated to helping the teachers seek solutions to the teaching of reading by employing greater flexibility of teaching styles and materials.[1] This section will attempt to explain the schema of

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[1]See letter from Mr. Albert Budnick, Principal, P.S. 9 (Queens) in Reichart, et al., The Taxonomic Instruction Project (First Report), pp. v-vi.

Figure 1 horizontally, using each characteristic as the basis for a concept of remediation.

1. Hyperactivity

The usual "600" school student fits well Newman's description of a hyperaggressive child. "He cannot share the teacher or the spotlight; he must be the first and get the most. He demands immediate and constant attention. He cannot bear to be wrong or to fail, yet he cannot ask for help or follow directions. Whenever he is placed within an ordinary school set-up, he disrupts classes with violent, alarming, unpredictable outbursts."[1]

The hyperactive style as it is observed in a large number of "600" school students seems antithetical to the traditional junior high school and high school emphases of discipline and orderliness as documented by Mayer.[2] Consequently, much of the Control Group teachers' time could be interpreted as trying either to suppress it or control it. In-seat tasks were usual. Leaving the desks could be accomplished only by obtaining permission from the teacher. Gross motor activity was held to a minimum during the reading period. The use of either gross or fine kinesthetic movements to facilitate

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[1]Ruth Newman, "Changes in Learning Patterns of Hyperaggressive Children," in Conflict in the Classroom: The Education of Emotionally Disturbed Children, ed. by Nicholas Long, et al. (Belmont, California: Wadsworth Publishing Company, Inc., 1966), p. 446.

[2]Martin Mayer, The Schools (New York: Harper and Brothers, 1961), pp. 267-290 and 315-336.

reading was rarely observed in the Control group.

Toward the end of the treatment period, the Treatment group teachers had changed their behaviors in dealing with the hyperactive characteristic. The Treatment group teachers were observed to plan frequent shifts of classroom activity patterns to allow students to shift physical and mental frameworks. Learning tasks in reading were often facilitated by gross kinesthetic movements such as bouncing a ball in cadence while reciting the alphabet or tracing letters in the air. Motoric games were utilized to channel excess energy and to keep attention. In several individual cases, where students exhibited chronic patterns of hyperactivity at primary reading level abilities, these activities produced dramatic increases in reading levels in a short time.[1]

There are several implications of these findings. One implication, also deduced by Staats and Butterfield,[2] is that unchanneled hyperactivity in students decreased reading skill acquisition, probably because it decreased the length of time a student could attend. In this study examination of correlations between reading

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[1]Individual cases are documented in Sandford Reichart, et al., The Taxonomic Instruction Project: A Manual of Principles and Practices Pertaining to the Strategies of Instruction (Second Report) (New York: Research and Demonstration Center for Handicapped Children, Teachers College, Columbia University, 1969), pp. 89-153.

[2]Arthur Staats and William Butterfield, "Treatment of Non-reading in a Culturally Deprived Juvenile Delinquent: An Application of Reinforcement Principles," in Children Against Schools, ed. by Paul Graubard (Chicago: Follett Educational Corporation, 1969), p. 284.

skill acquisition and tasks requiring long attention spans, e.g., correlations between scores on the Gates-MacGinitie tests and scores on critical analysis are often negative.

Another implication is that motoric and kinesthetic activities are stronger in this population than visual and ability activities, and are thereby more meaningful and intrinsically more motivating. This implication parallels the findings of Graubard on scores of the Illinois Test of Psycholinguistic Abilities.[1] Observation of the communication modes of the "600" school students shows that "body language" plays an integral part in idea transmission.

A third implication basic to the work of Chaney and Kephart[2] is that kinesthetic channels of idea transmission can be used either to supplement or replace other sensory channels in learning. Instances of dramatic increases in learning often showed that kinesthetic replication of learning units previously administered in an audile or visile mode appeared to result in faster learning with more retention.[3]

In short, even though special educators have demonstrated for

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[1]Paul Graubard, "Teaching Strategies and Techniques for the Education of Disruptive Groups and Individuals," in Children Against Schools, ed. by Paul Graubard, pp. 340-342.

[2]Clara Chaney and Newell Kephart, Motoric Aids to Perceptual Training (Columbus, Ohio: Charles E. Merrill Publishing Company, 1968), pp. 23-25.

[3]Reichart, et al., The Taxonomic Instruction Project (Second Report), pp. 89-153.

some time that kinesthetic learning is not only possible but desirable, the teachers did not often use motoric and kinesthetic learning. The Taxonomic Staff, however, demonstrated the possibility of both discipline and increased learning through the planned use of motoric activities in the classroom.

Recommendations for further activities of the Taxonomic Reading Project seem to emerge naturally:

1. The Taxonomic Staff should develop more fully units of motor and kinesthetic strategies and techniques for teaching reading skills. These units should replicate units already in existence which use other sensory modalities.

2. The Taxonomic Staff should assist the "600" schools in developing a "kinesthetic curriculum" for students with abilities testing at the pre-reading or primary reading level. This curriculum should systematically introduce, through motor activities, the fundamental motor skills and then the motor-interpreted reading skills the student will need. Completion of this curriculum should be mandated for each "600" student functioning at the aforementioned level of reading.

3. The Taxonomic Staff should assist individual teachers in developing instructional strategies which shift activities throughout the reading period. These strategies should assist teachers in utilizing several approaches to similar teaching objectives and thereby maintain the attention of hyperactive students.

2. Loneliness

The "600" school student was usually a "loner." Although he sometimes showed a gregariousness somewhat uncommon among his non-"600" school peers, he frequently reported feelings of isolation and loneliness. He was, as Auerswald described, "a restless drifter, an isolate from his better developed peers. He will tend to band with others who show the same effects of developmental arrest. He will drift with them as they collectively seek high level stimuli and gratification of primitive pleasure needs that can provide momentary meaning to life."[1] He usually sought a teacher's approval or advice in an individual way.

Most Control group teachers seemed to feel that relief from loneliness among their students was their responsibility. Their classroom manners indicated that they placed more emphasis on their own abilities to alleviate the concentration blocks imposed by loneliness than on the abilities of the other students. This responsibility was designated in the administrative agreements between project staff and school administrator which stated that the staff was to "preserve the teacher's image as the primary authority figure in the classroom; they were to recognize, acknowledge, and utilize the talents and resources of the teacher in executing the project

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[1]Edgar Auerswald. "Cognitive Development and Psychopathology in the Urban Environment," in Children Against Schools, ed. by Paul Graubard, p. 193.

program."[1] The observed frequent use of teacher-small group patterns of instruction seemed to place the burden of rapport with students upon the teacher, and enforced formalized patterns of communication during the class period. Since such groups were often constituted by reading ability levels, individuals in the groups assumed as personal those values denoted by their reading ability. Greater value was placed upon groups whose composition consisted of the better readers, and communications between groups were hampered by those value structures.

Loneliness was seen by the Treatment group teachers, however, as a problem which could be solved by peers better than by teachers. In an effort to provide peer acceptance as an antidote to loneliness, teachers in the Treatment groups attempted more student-student grouping and play activities than teacher-student and self-instruction activities.[2] This strategy seemed to effect a rapport and cooperation between students. The significant positive correlations found in the previous chapter between reading skill gain and play activities[3] attest to an effect of increased learning when peer activities were utilized.

That loneliness causes learning inhibitions is an implication

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[1]Reichart, The Taxonomic Instruction Project (First Report), p. 10.

[2]See Table 12, p. 58; Table 13, p. 60; Table 22, p. 70; Table 23, p. 72; and Table 27, p. 78.

[3]Table 27, p. 78.

underlying the Treatment group's rationale and supported by Auerswald.[1] Loneliness is often observed in the classroom as a student's preoccupation with a desire to be accepted. As such, it inhibits attention.

That loneliness must be overcome through peer contact and peer satisfaction is another implication supported by many studies of the group learning process.[2] If a student receives relief from loneliness only through a teacher, this relief cannot be reinforced in his home or neighborhood.

That the use of play strategies and student-student grouping are primary techniques for the overcoming of loneliness is the third implication from the Treatment group teachers' actions. Such techniques were used by Wolf, et al.[3] and Rosenbaum[4] and were found successful. They were postulated to expose the students to each other in non-threatening ways and allow success and peer approval through either individual or group accomplishments. Bettleheim[5] has shown

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[1] Auerswald, "Cognitive Development and Psychopathology in the Urban Environment," pp. 191-194.

[2] Graubard, "Teaching Strategies and Techniques for the Education of Disruptive Groups and Individuals," pp. 331-335.

[3] Montrose Wolf, et al., "Experiments with Token Reinforcement in a Remedial Classroom," in Children Against Schools, ed. by Paul Graubard, p. 322.

[4] Peter S. Rosenbaum, "Validating a Student-Student System of Spelling Instruction" (New York: Teachers College, Columbia University, November 1, 1970). (Mimeographed.)

[5] Bruno Bettleheim, Love Is Not Enough (Glencoe, Ill.: Free Press, 1950).

that the classroom can indeed be "therapeutic" in alleviating psychic states which interfere with learning.

The recommendations seem clear:

1. Teachers of the "600" schools with students similar to the students of this sample should be helped to a greater use of student-student grouping in reading.

2. Further, the Taxonomic Staff could be of great service to teachers in similar "600" schools by assisting them in the development of reading play strategies with positive reinforcement value and low social threat.

3. Poor Reader

Table 1 shows that the students of the sample are poor readers, but no group mean can serve to portray the pathos of the individual student who devalues himself as a poor reader because society does. Indeed, many students in this sample might be classified as non-readers. The case descriptions of sample students[1] seem consistent with research studies of New York City delinquent children which showed that "large numbers, 76 percent, of our population showed marked and disabling reading difficulty. One-half of this 76 percent manifested a disability of five or more years. Compare this with the

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[1]Reichart, et al., The Taxonomic Instruction Project (Second Report), pp. 89-153.

national average of ten percent."[1] Often students of this sample were seen attempting to hide their reading disabilities from peers outside the "600" school confines, sometimes risking disastrous social exposure.

A recognizable pattern of reading period activities emerged from analysis of the Classroom Observation Analysis Sheets of the Control groups. Perusal of raw data indicated reading activities in the Control group could be described as great amounts of time spent in the cells of symbolic discrimination, memory span, consonants, vowels, sight vocabulary, main ideas, details, skimming, teacher-small group or individual grouping, test-response mode, visual input, auditory input and oral output. Reading class placement, workbook and textbook activities were often prescribed on the basis of nationally standardized reading tests of a paper-and-pencil variety. Textual and workbook materials were usually those of a standard graded series. No daily testing of learned material occurred for evaluative feedback. Textual material was usually assigned in rigid sequence. Heterogeneity of instructional strategies was little practiced in these classes.

Teachers in the Treatment group, however, generally believed that standardized tests were inadequate to help them effect meaningful placement of students in reading groups and to diagnose their

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[1] Joseph Margolin, "An Experimental Approach to Reading Therapy," in Conflict in the Classroom: The Education of Emotionally Disturbed Children, ed. by Nicholas Long, p. 421.

students' reading problems. Consequently, they utilized the Taxonomic Staff to assist in developing informal, unit-based tests of reading progress. They also began to rely heavily upon curriculum materials made by themselves or, upon their request, by the Taxonomic Staff. The raw data of the Classroom Observation Analysis Sheet showed that teachers in the Treatment group, although utilizing those activities that the teachers in the Control groups used, also showed more use than Control teachers of the activities of language word structure, recreational reading, contextual inference, aesthetic perception, student-student and student-small group groupings, play-chance, play-competition and play-puzzle modes, multi-sensory input and motoric output.

The basic implication postulated by the Taxonomic Staff and the Treatment group teachers was that standardized tests and curriculum materials were inadequate to the everyday classroom needs of the teachers in the sample "600" school classrooms. This implication is supported by research.[1] The tests were not "culture fair" so as to sample adequately the population and the textbooks and workbooks proceeded at a pace and with material that did not fit the reading needs of the students. A basic assumption that this population could effectively utilize standardized curriculum materials was not possible with these students.

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[1]Doxey Wilkerson, "The School, Delinquency and the Children of the Poor," Children Against Schools, ed. by Paul Graubard, p. 116.

Instead, a second implication was derived by the Taxonomic Staff and the Treatment group teachers,[1] that the students in the sample "600" school needed a heterogeneity of curriculum offerings not only to teach them but to diagnose their classroom needs and prescribe remediation. Since the usual parameters of standardized reading tests, i.e., cognitive variables, were open to question, it was necessary to effect diagnostic teaching to test those skills for which the teacher was capable of training.

The heterogeneity of tests and reading prescriptions added a further implication, also propounded by Margolin,[2] that testing situations and materials had to be derived from material that was both relevant and current. The testing of global reading attributes or of information learned in the past seemed to increase anxiety in the student. Treatment group teachers found it helpful to conduct informal tests on material they had used within the week rather than material they less recently used. This testing helped to add structure to the learning situation and offered curriculum credibility to the student.

The recommendation is obvious: continue and expand Taxonomic teaching and Taxonomic resource staffs to individualize and

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[1]See entire rationale in Abraham Tannenbaum, The Taxonomic Instruction Project, An Introduction to Taxonomic Instruction (New York: Research and Demonstration Center for Handicapped Children, Teachers College, Columbia University, 1970), pp. 1-35.

[2]Margolin, "An Experimental Approach to Reading Therapy," p. 422.

personalize instruction.[1]

4. Different Experiential Backgrounds

The typical student of this sample was often a product of an experiential background dramatically different from that of his non-emotionally disturbed, socially maladjusted peers. His language experience was frequently that of bi-lingualism. His home was often characterized by marked instability, the absence of one parent, and mental pathology. His view of life was often geographically provincial, i.e., confined to one inner-city neighborhood. Margolin describes it thusly:

> Faced with the imposition of an unwanted, unappreciated and meaningless (learning) task by a hostile authority, Johnny is likely to react accordingly. The easiest and most benign way is by direct resistance to learning. As this proves less than satisfactory, behavior problems may develop.
>
> At home Johnny is faced by quite a different environment but with the same final effect on him. His parents tend to project responsibility, and probably care little about the value of school to the child, until some undesired attention summons them to school or court. Then the response is to the inconvenience or embarrassment of the situation, not to the absence of success for the child. There is little real valuation of learning and very little example of it.[2]

Yet because of the adherence of his teachers (control group) to the graded textbook and workbook series, his different experiential backgrounds were not usually considered. The textbooks and workbooks

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[1]Reichart, The Taxonomic Instruction Project (Second Report), p. 31.

[2]Margolin, "An Experimental Approach to Reading Therapy," pp. 421-422.

were often geared to white, middle-class standards, making the material irrelevant. The low Materials Use Index of students in the Control group, obtained by inspection, attests to the reliance of the teacher on the standardized textual materials.

Treatment group teachers, however, with the help of the Taxonomic Staff, valued heterogeneity of curriculum not only as a necessity for individualization and personalization but to attempt a simulation of the heterogeneity of learning experiences students might be offered in their home environments. The Treatment group teachers asked the staff for help in divergent approaches to material presentation and in making curriculum content more relevant to the inner city neighborhoods in which the students lived. They wanted to help students structure their own learning environments. The significant correlations between reading skill acquisition and the use of heterogeneous curriculum materials[1] may imply success in this practice.

The implications drawn from the practices of the Treatment group teachers and further explicated by Mayer[2] is not that heterogeneity of curriculum is necessary to diagnose differing backgrounds adequately, but that heterogeneity of curriculum is better than homogeneity of curriculum in the absence of curriculum based on local norms. In other words, the Treatment group teachers would have preferred to have curriculum based on local norms and adapted to

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[1]See Table 21, p. 68.

[2]Mayer, The Schools, pp. 116-117.

local standards of language, experience, etc. Lacking this material, a heterogeneous curriculum was found useful.

A further implication, one that is accepted by Kohn and Rudnick,[1] is that when curriculum material was seen as relevant and individual by the student, it was learned more quickly and with more intrinsic motivation. A difficulty in either developing or recognizing relevant curricula, however, rested with the teacher who often was constrained by yet another differing experiential background to the selection and usage of reading materials.

These implications again support the recommendation for personalization and individualization of instruction. In addition, it becomes obvious that a great service that the Taxonomic Staff could perform in any "600" school would be the service of scanning all materials being utilized in that school and attempting to make their content more relevant and meaningful to the student of that school.

5. Poor Self-Esteem

The "600" school student of the sample usually has low self-esteem. He does not feel worthy or accepted. He often engages in "tests" of others to prove that he is liked, esteemed, or even tolerated. He classifies his environment by his values. More than likely his values are correlated to his reading status which is

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[1]Martin Kohn and Marian Rudnick, "Individualized Teaching with Therapeutic Aims, A Methodological Study," Genetic Psychology Monographs, LXXII (1965), 91-137.

usually "low." Psychologically, his condition is described by Auerswald as thus:

> . . . the child from a seriously disorganized disadvantaged family, who has not had certain organized learning experiences at home, is unable to conceptualize the nature and purpose of his . . . class, its usefulness to him, the teacher's role and his own role. Therefore he must rely entirely on his sense of belonging. He will get meaning from the school experience only if he gets responses that give him a sense of belonging. He is not prepared to work out a sense of participation step by step.[1]

The poor self-esteem of the students which originated from feelings of failure in reading did not seem changed by the classroom activities of the Control group teachers. The grouping procedures of these teachers often distinguished "good" from "bad" readers. If a student was a "bad" reader, the entire class often witnessed his remediation in teacher-large group grouping practices. Often, in an attempt to keep order, a teacher used ridicule to control the class, thus reinforcing feelings of low esteem.[2] Perhaps the most obvious measure of a student's sensitivity to low reading status could be found in his subjective reaction to certain low level curricula. He termed it "baby stuff." Although this material was more related to his reading level, it was composed of vocabulary predominant to the beginning reading attempts of six-to-nine-year olds. This the students found demeaning and rejected it.

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[1]Auerswald, "Cognitive Development and Psychopathology in the Urban Environment," p. 185.

[2]See quotation of footnote 2, p. 120.

To attempt to combat the low self-esteem of the students, Treatment group teachers employed the strategy of student-student grouping. The "buddy" system could reduce the exposure of a student's low reading level to the entire class.[1] The curriculum materials were revised when possible to adapt their content and vocabulary to topics relevant to the student's interests. High interest-low vocabulary materials were sought.

As in the combat of loneliness, the Treatment group teachers sought peer approval as the preferred method of raising a student's self-esteem. A secondary implication, shared by Auerswald,[2] was that if peer grouping could not raise self-esteem, it might at least control the devastation of group censure of any student for having a low reading level through development of a sense of belonging.

A further implication, acted upon by the Treatment group teachers, was that effective curriculum materials were those with a content level befitting the age group of this sample. More effective learning would take place if the curriculum were age-relevant (Auerswald[3]).

Recommendations derived from these implications and these issues are suggested:

1. Teachers of "600" school students can effectively use a

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[1]Rosenbaum, "Validating a Student-Student System of Spelling Instruction."

[2]Auerswald, "Cognitive Development and Psychopathology in the Urban Environment," pp. 183-184.

[3]Ibid., p. 189.

variety of grouping practices to determine which grouping practices might encourage the growth of self-esteem in a student.

2. A Taxonomic Staff should assist a teacher in screening all curriculum materials to avoid materials which could have negative social value to the student.

6. Short Attention Span

To most of the students in this sample, a twenty-minute uninterrupted reading period promoted extensive restlessness. Ability to concentrate was limited to a range of one to ten minutes. A forty-minute pencil-and-paper examination seemed practically intolerable. An antidote for waning attention often seemed to be active movement. These symptoms are all congruent to the picture of the disadvantaged poor reader who has a short attention span, as described by Staats and Butterfield.[1]

The raw data show that in the Control group, it was common to find reading periods of twenty to thirty minutes without changes in reading activity. This length of period seemed to be in sharp contrast to the abilities of the students to attend and non-participation scores rose after ten minutes. Little intrinsic interest in the non-relevant curriculum likewise seemed to shorten the attention span of the students.

The Treatment group teachers, on the other hand, tried to attack

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[1]Staats and Butterfield, "Treatment of Non-Reading in a Culturally Deprived Juvenile Delinquent," p. 284.

the problem of short attention span as a problem of classroom management. With the help of the Taxonomic staff, they attempted to shift reading activities frequently toward unified reading objectives. Further, they attempted to make curriculum materials more interesting and relevant.

The Treatment group teachers and the Taxonomic staff found that a frequent shift of reading activities helped to lengthen the attention span of the "600" school student in this sample. Further, they found that the relevant and interesting curriculum they produced also helped to increase the length of students' attention spans. To be useful, however, this strategy could only be utilized when reading activities based on the same reading objectives were used so that general reading skills could be learned.

What is implied, however, is that heterogeneity of instructional content may be basically motivating to the student and fitting to his cognitive style. This is an implication that can be drawn from research in the success of like teaching methods, as described by Staats and Butterfield[1] and Quay.[2]

The recommendations are:

1. The Taxonomic Staff should help teachers plan or locate

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[1]Staats and Butterfield, "Treatment of Non-Reading in a Culturally Deprived Juvenile Delinquent," pp. 283-304.

[2]Herbert Quay, "Dimensions of Problem Behavior and Educational Programming," in Children Against Schools, ed. by Paul Graubard, pp. 207-208, 211-212.

multiple teaching strategies to obtain singular reading goals.

2. The Taxonomic Staff ought to assist a teacher in determining the potential ability any curriculum might have to capture a student's attention span. It should then help a teacher measure it through controlled observation (such as the procedures of the Classroom Observation Analysis Sheet).

7. Thought Disorders

A "600" school student of this sample often exhibited thought disorders. His perception of another's spoken or written communication was often distorted through a superimposition of a personal frame of reference on his perceptions. The student sometimes fancied that people were talking about him or plotting against him. He was no stranger to day-dreaming, extensive fantasy, and drug states. Indeed, a high incidence of thought disorders should not be unanticipated since a study of a large number of similar students showed that 45 percent had "academic difficulties" which were related to mental illness.[1] Some authors, in fact, tend to equate emotional disturbance with thought disorders.[2]

Clinical profiles of the intellectual or affective abilities of

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[1]Mary Alice White and Myron Harris, "Mental Illness in Relation to the Pupil Population," in Conflict in the Classroom, ed. by Nicholas Long, et al., pp. 146-149.

[2]Charlotte Buhler, et al., "What Is a Problem?" in Conflict in the Classroom, ed. by Nicholas Long, pp. 115-116.

the students were generally unknown to the Control group teachers. If these teachers had looked at available clinical profiles of their students they reported that they were generally baffled by the psychological jargon. Consequently, Control group teachers could give little attention to cognitive or affective styles of learning in their students. The tailoring of teaching strategies or methods to such styles was unknown and untaught.

Thought disorders remained an enigma to the Treatment group teachers as well. With extensive help from the Taxonomic staffs, inter-item analyses of individual standardized reading tests were examined for helpful information, but seemingly little assistance was gained by this activity (as measured by change in teacher behaviors). Possibly the most useful activities to teachers were the extensive conversations between Treatment group teachers and the Taxonomic staff about the differing learning styles of students with suggestions for the adaptations of curriculum content to meet individual needs. There was a quality of experimentation in the classes of the Treatment group teachers which was not found in the Control group teachers and which could not be measured by the Classroom Observation Analysis Sheet.

The activities of both Control and Treatment group teachers implied that all teachers needed clinical information about each student which could be easily translated by teachers into learning modes and styles of instruction. These implications are also

suggested in the work of Bloom,[1] Witkin[2] and others who offer frameworks for components of the instructional act by which these components may be stylized to an individual's cognitive, affective and perceptual needs. This implication was a frustration to the Taxonomic staff which was not able to offer this assistance to teachers.

Therefore, a recommendation for further research in the Taxonomy of Instructional Treatments would be to translate the Taxonomy parameters into cognitive and affective style components. This would, in effect, convert the Taxonomy into a useful tool in diagnosing certain learning styles in individual students and prescribing materials and strategies labeled by the Taxonomy. Such a recommendation is further described in Appendix A.

8. Familiar with Non-Structured Environments

The "600" school student of this study was often a stranger to a structured, ordered life. Haring and Whelan describe such children as "controlling, disorganized, unproductive and unilateral in their approaches to daily expectations, relationship with peers and authority figures."[3] When presented with structure he often responded

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[1]Benjamin Bloom, et al., Taxonomy of Educational Objectives Handbook I: Cognitive Domain.

[2]Herman Witkin, et al., Personality Through Perception and Experimental and Clinical Study (New York: Harper and Co., 1954).

[3]Norris Haring and Richard Whelan, "Experimental Methods in Education and Management," in Conflict in the Classroom, ed. by Nicholas Long, et al., p. 390.

favorably; sometimes he responded compulsively, sometimes ambiguously. Because his home and neighborhood life were often chaotic he was sometimes confused by the transition from the structure of his school to the disorganization of his neighborhood environment. Graubard[1] reports that the socially maladjusted child will often attempt to structure his own society, a delinquent subculture.

Among the Control group teachers the need for orderliness was seemingly the rationale behind the frequently observed employment of the test-response mode and the teacher-small group grouping. Investigation showed that the possibility of teaching a student to structure his own learning environment out of the chaos of his living environment was usually not a goal of the standardized curriculum material which the Control group teacher used. The structure of the Control group classroom therefore stood as a world different to the student from the world of his non-structured neighborhood.

To attempt to help students structure their learning environments, activities were initiated by the Treatment group teachers to more clearly delineate the educational objectives of each reading unit and to articulate these objectives to the students. Teachers also tried to have the students assist in educational goal setting. Favored activities for trying to help students generate structure from non-structure were the activities labeled Aesthetic: creation,

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[1]Graubard, "Teaching Strategies and Techniques for the Education of Disruptive Groups and Individuals," pp. 331-332.

Aesthetic: interpretation; and Play-chance. In these activities attempts were made to translate aesthetic activities into reading exercises. Unfortunately, these types of activities were used too infrequently to elicit viable measurement.

Recognizing the non-structured nature of the student's home life, an obvious implication was that learning structure had to be clearly delineated to be meaningful, an implication shared by Graubard.[1] It seemed obvious that structure was probably understood better in the Control group than in the Treatment group because instruction was more ritualized. Attempts were made in the Treatment group to make structure more meaningful by giving it a context.

A second implication is that to make structure meaningful, it must be articulated and exemplified in the midst of chaos. This implication has been translated into methodology by Graubard.[2] A student has to learn that he can himself structure his environment and that he can derive learning in the midst of diversity. The learning act must be explained to the student and he must try, under the supervision of the teacher and, perhaps, with his peers, to structure the classroom and then his world to fit his learning modes.

The implications suggest the following recommendations:

1. The Taxonomic Staff can effectively help teachers help

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[1]Graubard, "Teaching Strategies and Techniques for the Education of Disruptive Groups and Individuals," pp. 329-352.

[2]Ibid.

students like those in the sample "600" schools if they will assist the teacher in defining the structure or non-structure of the classroom, succeed in helping him control it, and utilize structure as a content to be taught.

2. A greater use of play-chance strategies and aesthetic content strategies should help a student learn to structure his learning environment in the midst of diversity.

9. Differing Modes of Perceptual and Motor Learning Effective

The perceptual-motor needs of the typical student in this sample are great. He often has faulty perception which must be remediated by proper kinesthetic exercises. Coordination is frequently faulty. Hyperactivity often hides a lack of motor ability. This finding was surprising to the resource staff, for the literature does not mention these characteristics as typical of this group. Auerswald,[1] however, postulates a theory of deprivation of integration stimuli which could account for these and other symptoms which might suggest a lack of perceptual and motor development.

Favored channels of learning were not tested for or taught to in the students of the Control group. The general pattern of visual or auditory input and oral or no output was adhered to strongly. It was not obvious to these teachers that other channels of sensory

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[1]Auerswald, "Cognitive Development and Psychopathology in the Urban Environment," pp. 181-199.

input or output might be more effective. These other channels were not tried. Only infrequently were foundational perceptual activities such as symbolic discrimination or basic motor tasks practiced even though it was obvious, from preliminary testings, that most students functioned at a reading readiness level.

Through the help of informal diagnostics and the observations of the Taxonomic staff, the perceptual motor differences of the students were noticeable to the teachers of the Treatment group. The teachers generally sought to overcome perceptual-motor deficiencies in their students by teaching with a heterogeneity of sensory channel input and output. That they were successful is attested to by the correlations of reading skill gain with multi-sensory input and output measures reported in the previous section.[1]

It seems possible to imply from the results of the correlations and from the observations of the Treatment group teachers that for this group of students visual input and oral output were less effective than other modes for learning certain reading skills. Auditory input is correlated, for example, with significant improvement in scores of the Gates-MacGinitie Comprehension Test, the Wepman Auditory Discrimination Test, and tests of vowels and letter names. On the other hand visual input is negatively correlated with the scores of Gates-MacGinitie Comprehension Test in Treatment group two.[2]

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[1]Table 22, p. 70; Table 23, p. 72.

[2]All correlations taken from correlational matrix not fully reported in this study.

Because there are obvious needs for identification and remediation not addressed by the Taxonomy of Instructional Treatment, the recommendations are thus:

1. The Taxonomic staff should further assist teachers in the translation of teaching units to differing perceptual, sensory and motor modes.

2. The Taxonomic staff should develop or adapt tests of perceptual and motor skills using the variables of the Taxonomy of Instructional Treatments.

10. Motivated for Help from "600" Schools

The typical student from this sample treated the "600" school with respect. As previously stated, he had usually been expelled from other schools and he felt that this was his last chance to "make it" before psychiatric or criminal incarceration. Generally his parents had been indoctrinated in the importance of the completion of schools (with its subsequent financial rewards) and had tried to indoctrinate their sons likewise. This attitude on the parts of the students in this sample ran contrary to attitudes usually reported in the literature.[1]

The students seemed to prefer the Control group teachers to the Treatment group teachers, even though the more dramatic reading breakthroughs seemed to be coming from the Treatment group teachers.

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[1]Graubard, "Teaching Strategies and Techniques for the Education of Disruptive Groups and Individuals," pp. 331-332.

The apparent reason for this was that the Control group teachers and their methods appeared "traditional." That is, the students easily identified the school as a school and not as a clinic or jail. They saw a standardized curriculum as similar to that of their "other" schools and accepted the challenge of trying to master it and thus return to the "other" school. Even though they liked their "traditional" school, they were somewhat unclear as to what their educational objectives might be in attending it. They obviously knew that they were usually not making fast progress in reading.

When breakthroughs in reading came to students, the motivation of the students to whom they occurred was dramatically increased. Indeed, the smallest gain in reading skill acquisition would, when perceived by the student, usually result in intensive effort to capture and improve it.[1] Consequently, the Treatment group offered more possibilities for increased motivations, but was often hampered by the fact that students resisted divergent methodological approaches.

The implication of this finding is that school will individually be made more motivating if it <u>obviously</u> attempts individualization and personalization of the curriculum. That is, the school should strive to make its curriculum meaningful and useful to the student through active participation in his curriculum design.

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[1]Reichart, <u>The Taxonomic Instruction Project</u> (Second Report), pp. 89-153.

Summary

This study was an attempt to evaluate a method of in-service teacher education geared to helping emotionally disturbed, socially maladjusted boys (ages nine to fourteen in special urban day schools) improve their reading skills. The method was named the Taxonomy of Instructional Treatments and the criterion was the improvement of reading scores.

The Taxonomy of Instructional Treatments defined the operations of reading, applied the definitions to a taxonomic schema, and structured this schema for use in diagnostic teaching, the planning of teaching strategies and content, and the classifying of instructional materials for reading.

The materials of using the Taxonomy of Instructional Treatments were taught to two groups of teachers in a "600" school (for emotionally disturbed, socially maladjusted boys) by a resource staff. One group of teachers, T_1 (maximum orientation), received a great deal of help from the resource staff and extensively utilized an instructional materials center provided. Another treatment group, T_2 (minimum orientation), received a staff orientation to taxonomic instruction but little else. These two treatment groups encompassed six teachers and thirty-eight students.

In addition to the Treatment groups, there were two control groups, C_1 and C_2. C_1 was contained within the same school as the treatment groups who received no resource help or use of the

instructional materials center. The C_2 group was contained in another "600" school and received no orientation or help from the taxonomic staff. Nine teachers and forty-seven students were included in these control groups.

Measurements were taken on students at the beginning and end of the school year. They were tested on the Gates-MacGinitie Tests of Reading Vocabulary and Comprehension, the Peabody Picture Vocabulary Test, and the Wepman Auditory Discrimination Test. Further, they were given a battery of sixteen staff-made tests of the elements of reading: letter names, letter sounds, vowel names, short sound vowel production, long sound vowel production, short sound vowel recognition, long sound vowel recognition, two-letter consonant blends, three-letter consonant blends, rule of the final "e," vowel blends, compound words, alphabet--capital letters, alphabet--lower case letters, initial consonant recognition, and final consonant recognition.

The major hypothesis, that there would be a significant difference in the post-test Gates-MacGinitie Reading Test scores was tested by an analysis of co-variance holding constant the subjects' pre-test Gates-MacGinitie Reading Test scores and then I.Q. scores from the Peabody Picture Vocabulary Test. The major hypothesis was not substantiated.

Exploratory data analyses were computed by analysis of co-variance on the post-test scores of the staff-made tests, holding constant their pre-test scores, Gates-MacGinitie Vocabulary, Gates-MacGinitie Comprehension scores, and I.Q. scores. Four variables were

found to be significant: letter names, short sound vowel recognition, short sound vowel production and two-letter consonant blends. Treatment group scores were significantly higher than control groups in analyses of group means using the Scheffé test.

Exploratory correlations were run between scores representing involvement in Taxonomic activities, derived from scheduled observations of the reading classes of the two treatment (T_1 and T_2) and one control group (C_1) in the experiment, and reading score gains. This analysis revealed that students made more reading score gains when motor activities were utilized as a learning mode, when reading content was made more relevant to their experiences, when differing experiential and knowledge levels were accounted for in instructional materials, and when teachers employed a variety of equivalent reading strategies to compensate for short attention span. These effects and interpretations were observed despite the fact that the schools used in the experiment had been in turmoil the entire year because of a teacher strike.

A qualitative examination of the effect of the Taxonomic Resource Staff indicated that significant instructional modifications had been observed in the Treatment group teachers. The limitations of the study prevented the adequate measurement of these modifications, but further evaluation should assess this impact more precisely.

Further research in a less chaotic year was recommended.

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APPENDIX A

DEFINITION OF TERMS

1. Diagnostic Teaching: The obtaining of a profile of a student's educational strengths and weaknesses by a teacher using teaching skills and tools normally taught in teacher preparation classes or experienced in everyday encounters with students. To practice diagnostic teaching, the teacher must postulate hypotheses about any child's educational functioning and prove or disprove these hypotheses through teaching skills and tools.

Peters notes that the teacher has three main categories of skills and tools available to him for diagnosis of the student's educational profile.[1] First, he notes that the teacher sees the child over a period of time, a condition not usually available to a psychologist. The opportunity available to the teacher to collect data over this period of time allows systematic observations about a child which may rule out problems of a temporary nature.

A second facet of diagnosis open to the teacher is that of formal and informal testing. Teachers are generally trained in the use of certain types of achievement and progress tests and can utilize these as part of the diagnostic picture of the child. Furthermore, Peters notes that sociometric studies, observations of children in

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[1] Laurance J. Peters, Prescriptive Teaching (New York: McGraw-Hill Book Company, 1965).

standard situations, and observations of children in games and other school-related activities also provide objective data about the way a child learns and reacts to others. These studies and observations are obviously part of the province of the teacher.

Finally, the teacher has a chance to institute unexpected procedures with the child or to structure the child's social or physical environment in preconceived ways and then observe or test the child's reactions. This ability to test hypotheses by instituting an environmental condition is a situation unique to the teacher. The value of such data in the determination of a full course of treatment and education for a handicapped child is great.

2. Taxonomy of Instructional Treatments: "An analytic tool that facilitates matching teaching content and style with the diagnosed skill and behavior deficits of individual pupils."[1]

Procedurally, the Taxonomy of Instructional Treatments system works as follows:

> Through the use of quick-application, quick-scoring diagnostic instruments developed by the project staff, the teacher locates the specific skill deficits for each of his pupils. Those skills, along with the teaching materials designed to cultivate them, are coded and catalogued systematically in a master index. The index also contains a carefully coded and catalogued inventory of teaching styles that guide the use of the materials. In attacking a learning deficit, the teacher utilizes the index to select a preferred match of material and strategy to "plug into" each child during the teaching act. The index system also

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[1]Abraham J. Tannenbaum and S. Allen Cohen, "A Brief Guide to the Taxonomy of Instructional Treatments" (unpublished staff paper, Department of Special Education, Teachers College, Columbia University, New York, October, 1967).

allows the teacher to pinpoint the specific materials, channels of communications, and instructional methods, media, and modes that work best with specific types of pupils.

The Taxonomy is displayed on pages 146 and 147.

THE TAXONOMY

THE WHAT OF INSTRUCTION[1]

Basic Skills	Basic Subskills	Sequential Levels
1. Cognitive-Perceptual	1. Symbolic Discrimination 2. Memory Span 3. Directionality-Laterality 4. Time Relationships 5. Space Relationships	
2. Language Analysis	1. Consonants 2. Vowels 3. Sight Vocabulary 4. Word Structure 5. Syntax	
3. Comprehension	1. Main Ideas 2. Details 3. Sequence-Relationships 4. Word Meaning 5. Context Inference 6. Critical Analysis	1. Grades 2 and Below 2. Grades 2-4 3. Grades 4-6 4. Grades 6 and Above 5. Ungradable 6. Multilevel
4. Study Skills	1. Skimming 2. Dictionary 3. References and Texts 4. Maps, Graphs and Tables 5. Speed and Accuracy 6. Other Sources and Processes	

[1]Reichart, The Taxonomic Instruction Project (First Report), Appendix A.

THE WHAT OF INSTRUCTION--Continued

Basic Skills	Basic Subskills	Sequential Levels
5. Aesthetic Expression	1. Perception 2. Interpretation 3. Creation	

THE HOW OF INSTRUCTION

Instructional Method	Instructional Mode	Communication Input	Communication Output
1. Teacher-Total Group	1. Play-Chance	1. Visual	1. No Response
2. Teacher-Small Group	2. Play-Competition	2. Auditory	2. Oral Response
3. Teacher-Student	3. Play-Puzzle	3. Kinesthetic	3. Motoric Response
4. Student-Total Group	4. Test-Response	4. Auditory-Visual	4. Oral-Motoric Response
5. Student-Small Group	5. Exploration	5. Visual-Kinesthetic	
6. Student-Student	6. Programmed Response	6. Auditory-Kinesthetic	
7. Individual Self-Instruction	7. Problem Solving	7. Visual-Auditory-Kinesthetic	

3. Glossary of Terms--Taxonomy of Instructional Treatments[1]

AESTHETIC EXPRESSION (Basic Skill): the interpretive skill necessary for the reception of any sensory input, either verbal or non-verbal, which contains a cultural expectation; the output of a structured expressive content which fulfills the unique expectations of the creator and which elicits effective responsiveness.

AUDITORY (Communication Input): the stimulation of the sensory system of hearing through which information is transmitted to the student.

AUDITORY-KINESTHETIC (Communication Input): the stimulation of the sensory systems, hearing and body movement, through which information is transmitted to the student.

AUDITORY-VISUAL (Communication Input): the stimulation of the sensory systems, hearing and vision, through which information is transmitted to the student.

BASIC SKILLS: those areas of study (see the Taxonomy) that can be used to describe reading behavior; the terms can be used descriptively to diagnose the student's reading proficiency, prescriptively to remedy the student's reading deficiencies, and to catalogue the functions of instructional materials.

BASIC SUBSKILLS: those components of the basic areas of reading that are used for greater specification in describing reading behavior.

COGNITIVE-PERCEPTUAL (Basic Skill): the process by which the child develops structured, integrated intellective patterns, thereby stabilizing his view of the immediate environment and the world; as the channels of input interact with the total sensory system, they become ordered in a priority scheme in which seeing and hearing become the primary means of communication.

COMMUNICATION INPUT: the student's sensory channel selected by the teacher for transmission of information.

COMMUNICATION OUTPUT: the channel of expression selected by the teacher and utilized by the student to communicate a response.

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[1]Sandford Reichart, Taxonomic Teaching, A Staff Paper (New York: Research and Demonstration Center for Handicapped Children and Youth, Teachers College, Columbia University), Appendix A.

COMPREHENSION (Basic Skill): the process of determining meaning from verbal and nonverbal cues by reference to internalized constellations of content acquired through sensory and cognitive experience.

CONSONANTS (Subskill of Language Analysis): all letters of the alphabet and their respective sounds except a, e, i, o and u.

CONSONANT BLENDS (Subskill of Language Analysis): the combination of two consonant sounds which keep their individual sounds but which blend into one another, e.g., BL as in the word "blend."

CONSONANT DIGRAPHS (Subskill of Language Analysis): the combination of two consonant sounds that lose their individual sounds and become a unified sound, e.g., TH as in the word "the."

CONTEXT INFERENCE (Subskill of Comprehension): the ability to formulate and internalize a body of content that is not specifically stated, but which is postulated or inferred.

CREATION (Subskill of Aesthetic Expression): the act of bringing into existence that which has not existed before, based on the experiential background of the child.

CRITICAL ANALYSIS (Subskill of Comprehension): the evaluation of information, ideas and opinions contained in reading materials or discussions based on personal values, previous experiences and knowledge.

DETAILS (Subskill of Comprehension): the selection of specific and particular information from a larger body of content.

DICTIONARY (Subskill of Study Skills): the utilization of the dictionary for purposes of locating and pronouncing words, syllabicating, learning the use of stress, diacritical marks and syntax, and selecting appropriate meaning from the list of definitions.

DIRECTIONALITY-LATERALITY (Subskill of Cognitive-Perceptual):
directionality--the precise left-right linear eye movements and the return diagonal movements that are required for reading and that preclude any tendency toward reversals;
laterality--the preferential use of one side of the body.

EXPLORATION (Instructional Mode): that style of presentation which requires the child to refer to other sources of information or to his own realm of experience.

GRADES 2 AND BELOW (Sequential Level): an instructional range for reading that encompasses readiness skills up to and including the second grade.

GRADES 2 TO 4 (Sequential Level): an instructional range that encompasses reading skills the child is expected to acquire between the second grade and the completion of the fourth grade.

GRADES 4 TO 6 (Sequential Level): an instructional range for reading that encompasses readiness skills up to and including the sixth grade.

GRADES 6 AND ABOVE (Sequential Level): the assignment to this grade range of those reading skills that are acquired during the upper elementary and secondary school years.

INDIVIDUAL SELF-INSTRUCTION (Instructional Method): a setting in which the student is personally involved in instructing himself and in which he sets his own pace for learning.

INSTRUCTIONAL MODE: types of formats and styles that provide the students with a varied presentation of materials.

INSTRUCTIONAL METHOD: classroom groupings that provide the child with various instructional settings.

INTERPRETATION (Subskill of Aesthetic Expression): the bringing forth of meaning from works in all the media of the communication arts, based on one's own experiential background.

INDIVIDUALIZATION: that process by which the teacher, through diagnostic and evaluative procedures, pinpoints the combination of skills and methods of presentation which are uniquely motivating for a particular child in a specific environment and point in time.

KINESTHETIC (Communication Input): stimulation of the sensory system which transmits the sensation of movement or tension in muscles, joints and tendons.

LANGUAGE ANALYSIS (Basic Skill): an examination of all the elements of language, from minimal to larger units, and the synthesis of those units into meaningful contexts to develop language competency.

MAIN IDEAS (Subskill of Comprehension): the development of the ability to select the most important data from a body of content.

MAPS, GRAPHS, AND TABLES (Subskill of Study Skill): the ability to decipher the symbols that facilitate the reading and construction of maps, graphs, and tables.

MEMORY SPAN (Subskill of Cognitive-Perceptual Basic Skill): the ability to retain a cohesive unit of input, either in meaningful context or by "rote," which will ultimately be expressed as a verbal or motoric response.

MOTORIC (Communication Output): a written answer or bodily movement that is given by the student in response to a stimulus.

MOTIVATION: short term--the utilization of the setting, format and communication channel, or any combination of these, which stimulates the child to use his strengths to involve himself in the task;
long range--the child, having achieved success through short term motivation, then becomes self-directed.

MULTIPLE LEVEL (Sequential Level): that skill, activity or material for which many grade levels may be appropriate.

NO RESPONSE (Communication Output): an intrinsic reaction to a stimulus which is not visible to the observer.

ONGOING DIAGNOSIS: the systematic observation of the child's reaction over time to differing dimensions of the taxonomy for purposes of determining the strengths and weaknesses of his learning behaviors.

ORAL-MOTORIC (Communication Output): a written-vocal or kinesthetic response that is given by the student to a stimulus.

OTHER SOURCES AND PROCESSES (Subskill of Study Skills): those unique subskills which are within the range of study skills, but do not fit into those categories listed in the taxonomy: those unique subskills within the range of study skills, utilized infrequently by our population, and therefore not specifically listed in the taxonomy.

ORAL (Communication Output): an answer that is given vocally to a stimulus.

PERSONALIZATION: after individualization has been achieved, the child is exposed to settings, modes, inputs and outputs that force him to use his strengths to decrease his weaknesses. It is a process by which the child becomes less sensitive to frustrations generated in learning situations.

PLAY-CHANCE (Instructional Mode): the manner of instruction in which the element of chance is emphasized, e.g., instructional games where every player has an equal chance regardless of his skills.

PLAY-COMPETITION (Instructional Mode): the manner of instruction in which the element of competition is stressed, e.g., instructional games where the students are required to pit their skills against each other.

PLAY-PUZZLE (Instructional Mode): an instructional format which presents the student with a problem that can be worked out by means of the student's skills and is particularly adaptable for use in self-instruction.

PROBLEM SOLVING (Instructional Mode): presentation of a problem situation requiring the student to arrive at the appropriate answer through any means of reasoning.

PROGRAMMED RESPONSE (Instructional Mode): the presentation of material in which exposition is extensive, the sequential learning steps are small, the student receives immediate feedback as to the appropriateness of his response;
the student is expected to participate in this type of format by himself.

RECEPTION (Subskill of Aesthetic Expression): the exposure of students to works in the media of the communication arts for the purpose of developing sensitivity to and appreciation for cultural values.

RECREATIONAL READING (Subskill of Comprehension): reading for personal pleasure, which as a secondary factor, hopefully reinforces any and all comprehensive skills.

REFERENCES AND TEXTS (Subskill of Study Skills): those materials in specific content areas which are used to locate information in order to evaluate, organize and use needed data.

SEQUENTIAL LEVELS: the expected grade at which a skill would be attained or presented in a public school.

SEQUENCE-RELATIONSHIPS (Subskill of Comprehension): the ability to place specific information (using recall) in appropriate temporal and spatial order.

SIGHT VOCABULARY (Subskill of Language Analysis): those words whose retrieval is immediate because extended language analysis skills are no longer required;
an ever expanding reservoir of rapidly recalled words.

SKIMMING (Subskill of Study Skills): a rapid and superficial reading in order to get either a total impression or to locate specific information.

SPEED AND ACCURACY (Subskill of Study Skills): the ability to cope with the variable of speed while maintaining accuracy in comprehension.

STUDENT-SMALL GROUP (Instructional Method): a setting in which a student (acting as leader) is instructing or organizing a part of the class.

STUDENT-STUDENT (Instructional Method): an instructional setting whereby a one-to-one purposeful relationship exists between two students;
the students can be paired with equal or unequal skills depending on the goals of the teacher.

STUDENT-TOTAL GROUP (Instructional Method): a setting in which a student (acting as leader) is instructing organizing the rest of the class.

STUDY SKILLS: those tools which are taught by the teacher and used by the child to facilitate self-instruction and which are prerequisite for higher level independent inquiry.

SYMBOLIC DISCRIMINATION (Subskill of Cognitive-Perceptual): the ability to relate a symbol representation of an object, grapheme or idea, to the meaning of its original referrant and to find similarities, differences and equivalencies among representative communication input (requiring a feedback in its initial stages).

SPACE RELATIONSHIPS (Subskill of Cognitive-Perceptual): the recognition of the various dimensions of space and a discrimination of the placement of objects within these dimensions.

TEACHER-SMALL GROUP (Instructional Method): a setting in which the teacher is instructing a part of the class;
the small group is usually not more than six students.

TEACHER-STUDENT (Instructional Method): a one-to-one relationship for instruction between teacher and student.

SYNTAX (Subskill of Language Analysis): language elements above word level that are ordered to construct more expanded language units (phrases, clauses, and sentences); the selected order conveys a total meaning that is beyond the sum of the individual word meanings of the construction.

TEACHER-TOTAL GROUP (Instructional Method): a setting in which the teacher instructs a total group.

TEST-RESPONSE (Instructional Mode): a specific response required for a particular stimulus by means of which the teacher determines whether the child has learned the information that has been imparted.

TIME RELATIONSHIPS (Subskill of Cognitive-Perceptual): the sequencing of actions or events in the order of their occurrence.

UNGRADABLE (Sequential Level): a designation of skill requirement assigned to an activity or material which does not fall within any explicit grade level.

VISUAL-KINESTHETIC (Communication Input): transmission of sensory input(s) through the eyes and bodily movement of the student; the stimulation of the two sensory systems required to transmit visual and self-movement information to the child.

VISUAL-AUDITORY-KINESTHETIC (Communication Input): the stimulation of the three sensory systems required to transmit visual, aural and self-movement information to the child.

VISUAL (Communication Input): pertaining to the sensory input of sight (vision); the stimulation of the sensory system of the eyes through which visual information is transmitted to the student.

VOWELS (Subskill of Language Analysis): the letters a, e, i, o, u, and sometimes y and their respective sounds.

VOWEL DIPHTHONG (Subskill of Language Analysis): any vowel combination in which the vowels that make the combination lose their distinctive sound and become one speech sound, e.g., "OY" as in the word "toy."

WORD MEANING (Subskill of Comprehension): the development of the ability to select one of several meanings of a particular word used in a particular context.

WORD STRUCTURE (Subskill of Language Analysis): language elements that carry meaning on a word and sub-word level which may combine to create a more extended language unit on word level for communication.

APPENDIX B

INITIAL AND FINAL CONSONANT RECOGNITION

Directions

Please write your name, class and date on the right lines. Look at the first three syllables on the left hand side of the page. I am going to say a word that begins with the same sound as one of the syllables. Put a circle around the syllable that starts with the same sound as the word I am going to say. We will do Row 1 together. For Row 1, the word is WASTE . . . WASTE. (Circle the syllable WEH on your paper, hold it up to the children.

Which syllable did you circle? Yes, the third syllable is the correct choice. It begins with the same sound as the word waste. Now, remember to put a circle around the syllable that begins with the same first sound as the word I say. (Give words at five second intervals.)

ROW 2--the word is Numb

ROW 3--the word is Harm

ROW 4--the word is Magic

ROW 5--the word is Young

ROW 6--the word is Raise

ROW 7--the word is Daft

ROW 8--the word is Kitchen

ROW 9--the word is Gavel

ROW 10--the word is Baste

ROW 11--the word is Zebra

ROW 12--the word is Jungle

ROW 13--the word is Taffy

ROW 14--the word is Castle

ROW 15--the word is Vessel

ROW 16--the word is Loom

ROW 17--the word is Single

ROW 18--the word is Form

ROW 19--the word is Porch

APPENDIX B

INITIAL AND FINAL CONSONANT RECOGNITION

Directions

Please write your name, class and date on the right lines. Look at the first three syllables on the left hand side of the page. I am going to say a word that begins with the same sound as <u>one</u> of the syllables. Put a circle around the syllable that starts with the same sound as the word I am going to say. We will do Row 1 together. For Row 1, the word is WASTE . . . WASTE. (Circle the syllable <u>WEH</u> on your paper, hold it up to the children.

Which syllable did you circle? Yes, the third syllable is the correct choice. It begins with the same sound as the word waste. Now, remember to put a circle around the syllable that begins with the same first sound as the word I say. (Give words at five second intervals.)

ROW 2--the word is <u>Numb</u>

ROW 3--the word is <u>Harm</u>

ROW 4--the word is <u>Magic</u>

ROW 5--the word is <u>Young</u>

ROW 6--the word is <u>Raise</u>

ROW 7--the word is <u>Daft</u>

ROW 8--the word is <u>Kitchen</u>

ROW 9--the word is <u>Gavel</u>

ROW 10--the word is <u>Baste</u>

ROW 11--the word is <u>Zebra</u>

ROW 12--the word is <u>Jungle</u>

ROW 13--the word is <u>Taffy</u>

ROW 14--the word is <u>Castle</u>

ROW 15--the word is <u>Vessel</u>

ROW 16--the word is <u>Loom</u>

ROW 17--the word is <u>Single</u>

ROW 18--the word is <u>Form</u>

ROW 19--the word is <u>Porch</u>

Now look at the right hand side of the page. On this side we are going to listen for the end sound. I am going to say a word which ends with the same sound as one of the syllables in each row. Put a circle around the syllable that ends with the same sound as the word I say. Let's do the first one together.

ROW 1--the word is JUG . . . JUG. Which syllable did you circle? Yes, you should have put a circle around the first syllable. It ends with the same sound as the word JUG. Now, listen carefully.

ROW 2--the word is Cram

ROW 3--the word is Hub

ROW 4--the word is Cross

ROW 5--the word is Pink

ROW 6--the word is Lawn

ROW 7--the word is Roar

ROW 8--the word is Heat

ROW 9--the word is Shop

ROW 10--the word is Crowd

ROW 11--the word is Self

ROW 12--the word is Well

NAME_____CLASS_____DATE____

	FIRST SOUND				LAST SOUND		
1	ral	hink	weh	1	zug	yup	ponk
2	yup	nev	feld	2	sab	kic	yim
3	lib	obs	hig	3	filb	lef	pyl
4	min	yis	bal	4	san	fas	byn
5	yup	derf	jeb	5	kej	pik	filb
6	veg	ral	zin	6	deln	kim	sik
7	feld	dor	bli	7	nim	bil	lar
8	mik	kip	pak	8	cet	gip	puy
9	zim	jul	gub	9	pul	dap	tiv
10	bilf	vit	das	10	feld	sap	cib
11	pas	kic	zu	11	kim	ven	derf
12	jek	vum	qua	12	rul	lur	bub
13	gub	cet	tuc				
14	rin	cos	gel				
15	zil	vem	dis				
16	nev	pul	luk				
17	sab	ferb	cos				
18	sylp	yis	ferd				
19	pank	rin	das				

Directions for Administering Diagnostic Reading Test

I. 1. What are the names of these letters?

2. What do these letters sound like?
(Reward the first correct sound with approval.)

II. 1. What are the names of these letters?

2. What do their short sounds sound like? (Point to letters randomly.)

3. What do their long sounds sound like? (Point to letters randomly.)

4. What letters are these? (Give random short sounds.)

5. What letters am I now saying? (Give random long sounds.)

III. Here are some groups of two letters. These letters make a certain sound when they are in groups. Can you give me the usual sound they make when they are used in words? (Reward first correct sound.)

IV. Now here are three-letter groups. They, too, make a certain sound when they are used in words. Can you tell me what sound they make?

V. Tell me what these words are.

VI. What words are these?

VII. Tell me what these words are. Please try these words even if you don't know them.

VIII. 1. Please write the capital letters of the alphabet on these lines (point to page and pencil in front of subject). Please write them in order.

2. Now please write for me the small, or little, letters of the alphabet right here (point). Again, please write them in order.

Diagnostic Reading Test

NAME_____CLASS_____DATE_____

I. 1. l b t c k v n y r x

q z d f g h j s w m p _____

2. l b t c k v n y r x

q z d f g h j s w m p _____

II. 1. a e i o u _____

2. a e i o u _____

3. a e i o u _____

4. a e i o u _____

5. a e i o u _____

III. st cl ch fr gr tw th

sm wh pl bl sw sh hw

dr fl tr sn sp _____

IV. scr shr str spr thr spl _____

V. not-note fat-fate pet-Pete

win-wine cub-cube _____

NAME_____CLASS_____DATE____

VI. feed mail moat card

pain soil road tart

seat coin beak heel

ray lay _____

VII. inside overlook

invited depression

contentment substitution

manufacture resentfully _____

VIII. 1. — — — — — — — — —

— — — — — — — — —

— — — — — — — _____

2. — — — — — — — — —

— — — — — — — — —

— — — — — — — _____

APPENDIX

CLASSROOM OBSERVATION ANALYSIS SHEET

Class _____ Teacher _____ Observer _____

Date _____ Period _____ Time_____ to _____

Taxonomy Pupils Observed

	ITEMS	Basic Skills	Subskills	Seq. Level	Inst. Setting	Inst. Format	S.M. Input	S.M. Output		TIME																	TIME	
										2																	2	
										4																	4	
										6																	6	
										8																	8	
										10																	10	
										12																	12	
										14																	14	
										16																	16	
										18																	18	
										20																	20	
										22																	22	
										24																	24	
										26																	26	
										28																	28	
										30																	30	

Engagement Index (EI) = $\frac{\text{Engagement Time}}{\text{Total Observation Time}}$

KEY Item # = Engagement
R = Random Behavior
(N?) = Ambiguous Behavior
Circled Item # = Academic Digression
N = Nonengagement
T = Transition between tasks
X = Pupil's Absence

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APPENDIX C

NATURE OF DATA

Almost all scores used in the analysis of data represented conversions from the raw scores. Furthermore, not all data were obtained on all subjects. To clarify data and their sources, Appendix C states the name and assigned number of the data variables and their sources.

Variable No.	Name	Individual Score	N	Groups Included
	Staff Reading Battery (1-16)			
1.	letter names	raw and diff. scores	85	All
2.	letter sounds	raw and diff. scores	85	All
3.	vowel names	raw and diff. scores	85	All
4.	short sound vowel production	raw and diff. scores	85	All
5.	long sound vowel production	raw and diff. scores	85	All
6.	short sound vowel recognition	raw and diff. scores	85	All
7.	long sound vowel recognition	raw and diff. scores	85	All
8.	two-letter consonant blends	raw and diff. scores	85	All
9.	three-letter consonant blends	raw and diff. scores	85	All
10.	rule of final "e"	raw and diff. scores	85	All

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
11.	vowel blends	raw and diff. scores	85	All
12.	compound words	raw and diff. scores	85	All
13.	alphabet--capital letters	raw and diff. scores	85	All
14.	alphabet--lower case letters	raw and diff. scores	85	All
15.	initial consonant recognition	raw and diff. scores	85	All
16.	final consonant recognition	raw and diff. scores	85	All
	Other (17-21)			
17.	Wepman Auditory Discrimination	raw and diff. scores --no. of errors	85	All
18.	Gates-MacGinitie Vocabulary	grade equiv. diff. and raw scores	85	All
19.	Gates-MacGinitie Comprehension	grade equiv. diff. and raw scores	85	All
20.	Peabody Picture Vocabulary Test	I.Q.	85	All
21.	Materials Use Index	average no. of materials/S in observation period	55	T_1, T_2, C_1

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
	Taxonomic Observations (22-72)			
	Cognitive-Perceptual			
22.	symbolic discrimination	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
23.	directionality-laterality	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
	Language Analysis			
24.	consonants	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
25.	vowels	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
26.	sight vocabulary	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
27.	word structure	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
28.	syntax	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
	Comprehension			
29.	main ideas	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
30.	details	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
31.	sequence-relationships	% of time S spent in in activity from entire obs. period	55	T_1, T_2, C_1
32.	word meaning	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
33.	context interference	% of time S spent in in activity from entire obs. period	55	T_1, T_2, C_1
34.	critical analysis	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
35.	recreational reading	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
	Study Skills			
36.	dictionary	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
37.	speed and accuracy	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
38.	other sources and processes	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
	Aesthetic Expression			
39.	creation	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
40	Interpretation	% of time S spent in in activity from entire obs. period	55	T_1, T_2, C_1
	Sequential Level			
41.	grade 2 and below	% of time S spent in in activity from entire obs. period	55	T_1, T_2, C_1
42.	grade 2-4	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
43.	grade 4-6	% of time S spent in in activity from entire obs. period	55	T_1, T_2, C_1
44.	grade 6 and above	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
45.	ungradable	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
46.	multi-level	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
	Instructional Method			
48.	teacher-total group	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
49.	teacher-small group	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
50	teacher-student	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
51.	student-total group	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
52.	student-small group	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
53.	student-student	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
54.	individual self instruction	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
	Instructional Mode			
55.	play-chance	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
56.	play-competition	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
57.	play-puzzle	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
58.	test-response	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
59.	exploration	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
60.	programmed response	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
61.	problem solving	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
	Communication Input			
62.	visual	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
63.	auditory	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
64.	kinesthetic	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
65.	auditory-visual	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
66.	visual-kinesthetic	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1

APPENDIX C--Continued

Variable No.	Name	Individual Score	N	Groups Included
67.	auditory-kinesthetic	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
68.	visual-auditory	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
	Communication Output			
69.	no response	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
70.	oral response	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
71.	motoric response	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1
72.	oral-motoric response	% of time S spent in activity from entire obs. period	55	T_1, T_2, C_1

APPENDIX D

MEAN AND STANDARD DEVIATION OF DIFFERENCE SCORES[a] (PRE- AND POST-TREATMENT) OF VARIABLES 1-19

	T_1		T_2	
Variable	Mean	S.D.	Mean	S.D.
1	- .45	.10	.95	2.44
2	5.05	5.92	1.21	5.20
3	- .00	.00	- .00	.00
4	1.65	2.23	- .05	2.15
5	- .15	2.92	.32	2.50
6	1.00	2.05	.84	2.39
7	.45	1.39	- .00	.00
8	5.30	5.42	2.95	5.78
9	.80	1.94	.58	2.36
10	.55	2.37	1.21	2.15
11	.80	2.80	.63	1.74
12	.50	1.93	.58	.96
13	.30	3.85	.79	3.12
14	- .05	4.45	1.11	2.60
15	1.40	2.62	.89	1.76
16	.40	1.93	.05	1.31
17	-1.05	2.95	-1.05	4.06
18	.39	.53	.34	.98
19	.35	.84	.53	1.00

[a]Variables 1-16 are difference scores of raw data, number correct; variable 17 is difference score of raw data, number of errors; variables 18-19 are difference scores of grade equivalent scores.

APPENDIX D--Continued

C_1		C_2	
Mean	S.D.	Mean	S.D.
- .81	2.86	.07	1.11
.19		.57	3.35
- .00	.00	- .17	.95
- .68	2.02	- .03	1.75
- .19	2.79	.20	2.96
-1.31	2.33	- .13	1.41
.94	2.02	.50	1.04
1.81	4.71	.73	5.49
- .50	2.31	.27	2.20
.56	1.21	.60	1.67
.69	2.73	- .10	1.47
1.25	1.61	.73	1.51
- .69	3.40	.73	4.47
1.13	4.91	.13	4.54
1.81	2.34	- .10	1.95
.44	2.83	.13	1.72
-1.75	3.55	.13	2.15
.24	.49	.17	.57
.53	.50	.30	.86